

"BEST NEW COMPUTER MAGAZINE OF 1993" Computer Press Association

AUGUST 1994, VOLUME II, NUMBER 8
OS/2 FOR CORPORATE AMERICA

OS/2

PROFESSIONAL

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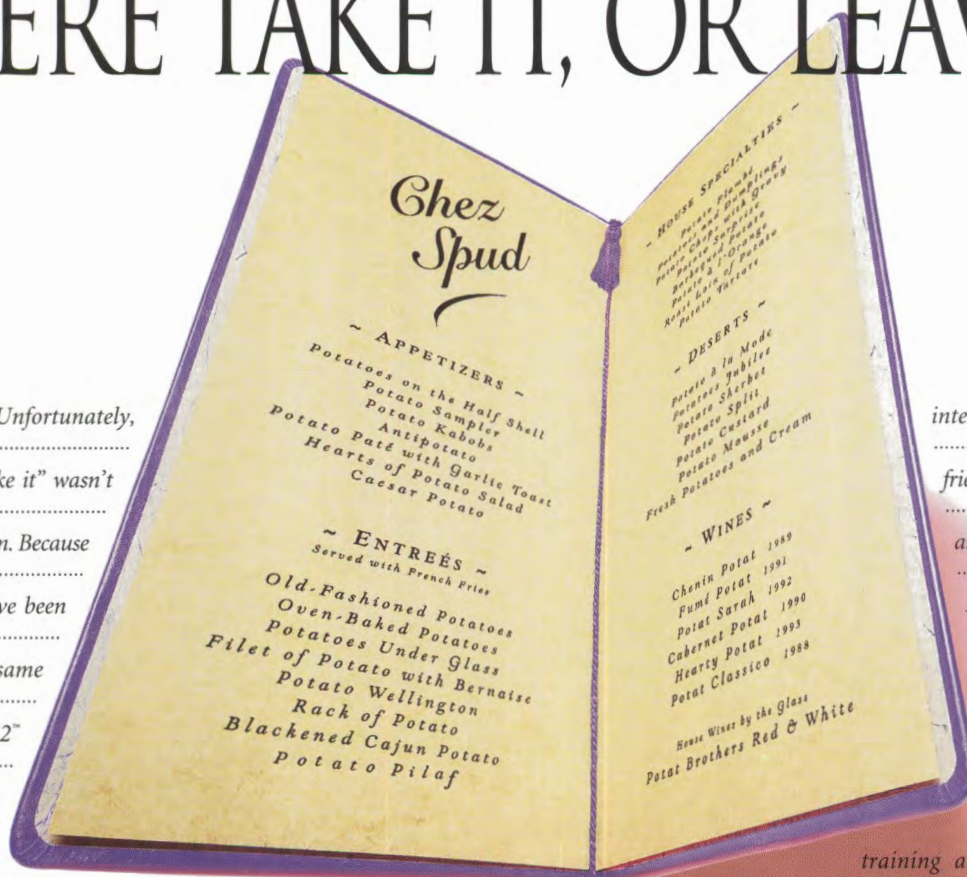
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AUGUST 1994

THE MAGAZINE FOR OS/2 PROFESSIONALS

PROFESSIONAL VOLUME II, NUMBER 8

SPECIAL REPORT

16 Cache As Cache Can

Tuning is the key to OS/2 performance. And the key to tuning is benchmarking.

BY FRANK V. CASTELLUCCI AND MARK B. FRIEDMAN

PRODUCTS & REVIEWS

25 HANDS ON The Plastic Software Library

Spinning a vision of the future with the *OS/2 Professional CD-ROM*.

BY HERB TYSON

29 EYE ON THE MARKET SMART: How Sweet It Is

The ability to convert 16-bit code into native OS/2 apps removes one major obstacle to OS/2's market growth.

BY MICHAEL S. KOGAN

43 DOT EXE Bradley D. Klierer takes a look at IBM's C Set++ and Soft & GUI's Error Manager, and Marlene Semple reviews BocaSoft's Wipeout.

51 CONNECTIVITY The Challenge of Networked CD-ROM Drives

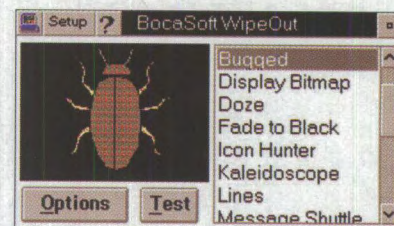
Take the time to consider the issues involved in selecting the proper CD-ROM drive for networking use in an OS/2 environment.

BY WAYNE RASH JR.

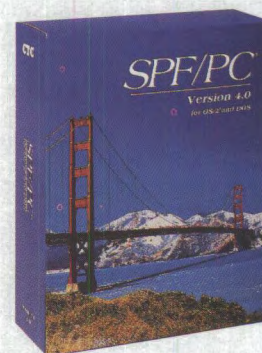
55 MARKETLINE Pro Engineering rolls out EZRAID Lite, Command Technology Corp.'s SPF/PC version 4.0, and the latest news from the OS/2 Vendor Council.



PAGE 16



PAGE 43



PAGE 55

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THE MAGAZINE FOR OS/2 PROFESSIONALS

Table of Contents—Continued

TECH TALK

59 CODE CACHE **OS/2 Inter-Process Communication: Pipes**

Using OS/2's utility to redirect output from one program into another through pipes.

BY CAREY GREGORY

67 THE IS NOTEBOOK **Leaping Between OS/2 and DOS**

Safety net tips on how to make the most of Dual Boot and Boot Manager.

BY GORDON SCOTT

DEPARTMENTS & COLUMNS

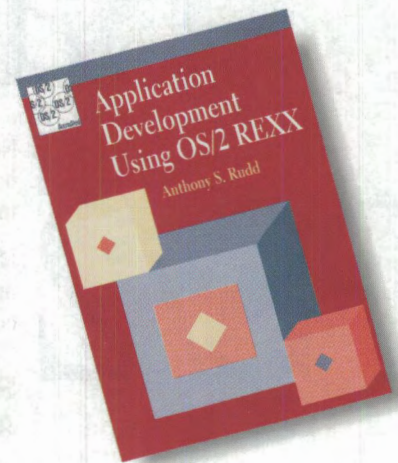
9 INPUT Congratulations, criticisms, and observations from our readers.

11 BYTES & PIECES OS/2 storms Japan, bargains at IBM's Raleigh outlet, and preloading revisited.

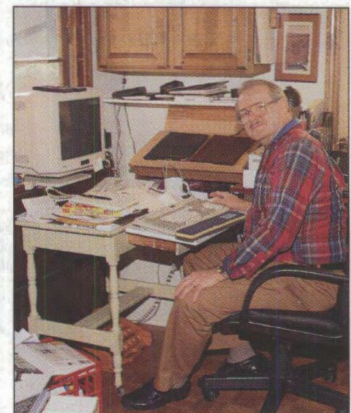
13 ZACHMANN'S VIEW IBM should convince every hot new digital edge multimedia software developer to put its latest and greatest products onto OS/2.

71 BOOKSTAX Alan Jay Weiner reviews *Application Development Using OS/2 REXX*, by Anthony S. Rudd.

72 THE VIEW FROM CHAOS MANOR Jerry Pournelle muses on how to beat the summer doldrums.



PAGE 71



PAGE 72

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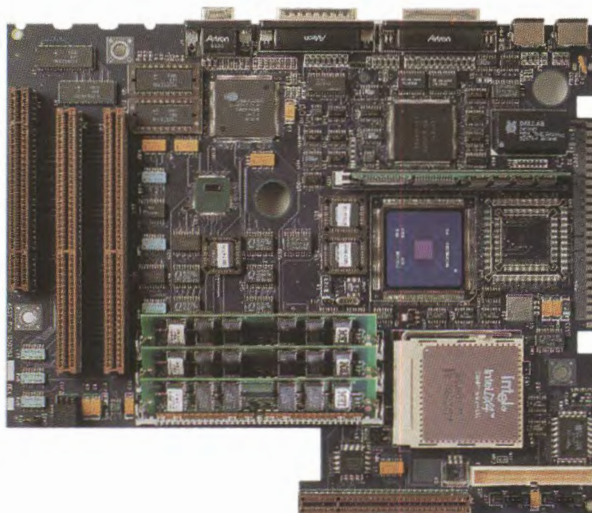
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Back issues: Back issues are \$7 each (except issues prior to August 1993 which are priced according to supply). Order back issues by sending check or money order and specifying the issue requested. We cannot accept corporate billing or credit card charges unless the back issue request is part of a new subscription.

Administrative, Editorial & Production Offices: Edwin Black, Publisher and Editor-in-Chief, Alan S. Kay, Executive Editor, Margaret M. Dutcher, Assistant Publisher, 172 Rollins Ave., Rockville, MD 20852, Phone: (301) 770-3333, FAX: (301) 770-7062.

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BPA International Membership Applied For August, 1993

OS/2 Professional is published monthly and mailed to qualified OS/2 users by I.F. Computer Media, Inc. Send correspondence, and all requests for qualified subscription forms to *OS/2 Professional*, 4604 Chicago Ave. South, Minneapolis, MN 55407, (612) 823-2657, FAX: (612) 823-0151.

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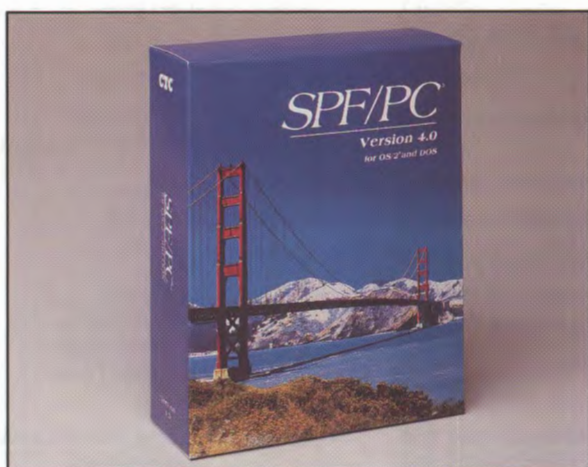
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Bloodhound Sniffs Out Success

Last month's cover story on Bloodhound prompted more response than any other article we have ever published. We received bravo calls, faxes, and e-mail from OS/2 users around the world. Most of all, the OS/2 community has responded by ordering Bloodhound from OS/2 Express, currently the only source we know of outside IBM from which to obtain the product. Indeed, it took weeks of wrangling with IBM and its complex delay-oriented distribution network for them even to admit the product existed, and then weeks more to deliver an order. At press time in mid-July, OS/2 Express hopes to actually double the client base of Bloodhound (formerly SearchManager/2) by the time this issue mails in August.

We did it not by wasting millions of dollars with year-long planning projects and by flying execs across the nation. Instead, we took matters into our own hands to prove the power of OS/2 applications, which are so inherently salable that simple common sense and a few hundred dollars can outperform Big Blue's marketers.

What's IBM's reaction to the story? It has stonewalled all inquiries. John Prestigiacomo, a program manager who oversees Bloodhound marketing, flatly refused to discuss it. Brodeur & Partners staffer Jennifer Surro told us, "IBM has decided it will not comment." Why? "Because they choose not to."

A 41,000 piece direct mail test campaign showcasing a range of apps—including Bloodhound—has suddenly been mailed. The estimated cost, including the design firm's fee, exceeds six digits. If the mailer delivers a good return, the company plans to mail another 200,000 to 300,000 copies. But our information is that the test mailing went to a stale list of uncorrected names. We have a copy of the mailer—it's quite pretty, very expensive looking—but no one else we know has received one. If you've gotten one, let us know. (Ironically, if such a mailer were to deliver the standard 1 to 3 percent return, IBM couldn't fill the orders quickly. Insiders tell us less than 500 boxes of the product exist.)

The whole Bloodhound flap reminds me of the spring of 1993,

when a number of ISVs were so frustrated with IBM's marketing ineptitude that a number of them banded together to buy or rent OS/2 away from IBM, perhaps to create an "OS/2 Lite." They were unsuccessful. But a few months later, the OS/2 Independent Vendor Council formed to help promote OS/2 applications.

I thought then I understood their frustration, but never as much as now. One major reason why IBM can't make OS/2 competitive is that it hasn't demonstrated how powerful its applications are. And that's because the people in charge don't have a clue about the marketplace they are catering to.

Bloodhound is just one of many extraordinary OS/2 apps hiding in IBM warehouses or being stifled in ISV basements because IBM has broken a promise to promote and cooperate. We are going to look into the strong points and weak points of other OS/2 apps—IBM and independently developed. Exposing the failures, and more importantly highlighting the successes, is key if we are to turn OS/2 around in the coming months as we get closer to the arrival of Chicago.

And we're going to name names—a thought that terrified IBM representatives when we told them. It's just too easy

to blame Deep Blue, the anonymous and faceless IBM, for the problems. On the other side of the coin, too rarely do the potential heroes of the day get mentioned at all. So here're a few names to start: Dan Lautenbach, Peter Hayes, Joanne Meleski, Allison Johnson, Keith Lindenburg, Estella Marisi, John Prestigiacomo, John Prial—these and many others are responsible for the day to day decisions that make or break the marketing, promotion, and advertising of OS/2 and the software that serves it. When they do something right, *OS/2 Professional* will be there to focus on their achievements. And when it goes the other way, we'll be there too.

Stay tuned. The DOA story was just a foot in the door. ♦

Edwin Black

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Comments, criticisms, and observations

How friends are treated

I'm sorry I flamed Jerry Pournelle a few months ago, because in the June issue [The View from Chaos Manor] he hit a raw nerve when he said, "It was as if the two IBM booths were owned by two different companies. In fact, it seemed like the hardware company didn't even like the OS/2 people."

A year and a half ago, I purchased my IBM ThinkPad 700C laptop computer specifically for OS/2 product development, after being assured by the dealer, and my IBM rep, that the machine was more than capable of running OS/2.

In all the time I have owned the ThinkPad, it has *never* run OS/2 properly. The machine has frozen up when it was suspended and then resumed. Where and when the battery died, OS/2 would die also before I could change to a new battery. The video drivers behaved strangely, locking the machine up whenever a seamless Windows session was started. When I called PS/2 support, it was "We don't have a machine with OS/2 running on it," and when I called OS/2 support, it was "We don't have any ThinkPads here so we can't reproduce your problem."

At the IBM PSP TI in the San Francisco Hilton, the hang/trap people finally traced the resume/freeze problem by putting a debug kernel on my machine: Somehow, in all the activity associated with APM coming out of suspend, a couple of hard disk interrupts were being lost—OS/2 had control blocks queued just waiting for those already-delivered or never-to-be-delivered interrupts.

Now, was that because of OS/2 or PS/2? I called OS/2 support from a phone in the Hilton lobby to tell them what the hang/trap team had found. They told me my 60 days of support were up—they wouldn't take my call. I called PS/2 support and they said that the problem was definitely OS/2, and should be fixed with the next service pak in a couple of months. Well, the next service pak has finally arrived, and I've put it up. We'll see over the next few weeks.

But, IBM, if this is how you treat your friends, I'd hate to be just a customer.

Doug Campbell
Culver City, California

How products are sold

I want to talk about the way products for OS/2 are sold. I ordered a bundle of software, a special from one of the vendors, and have been waiting for over six months for the order to be filled in-full.

In another case, which is probably my own fault, I bought a cutting edge tape backup product. A major manufacturer and the vendor both said there was full support for OS/2 with backup software. After that, I bought some backup software from a third party, which guaranteed the software would work. After three months of calling the company and its BBS, I was finally told that to get the software to work, I had to buy an EISA bus machine and find the latest set of drivers for the SCSI card. Then, I would have a tape backup for OS/2.

I am still looking for a backup software that supports my tape drive under OS/2, and works.

Jack Allison
Via the Internet

Corel: In or Out?

After reading your interview with Corel CEO Michael Cowpland [Q&A, January], I was excited about the news that CorelDRAW 5.0 would be out around August. I've been planning to buy an illustration package and a new OS/2 version of the market's hottest had me sold instantly.

Guess what? I called Corel Corp. to ask whether it would be better to buy the Windows version 5.0 or the OS/2 version 2.5 if I wanted to upgrade to the newest OS/2 version when it came out. I was told that Cowpland was "misquoted" and that the company had "nothing in the works" as far as developing a newer OS/2 version!

Misquoted? How can an entire interview about CorelDRAW, its future, and particularly its future with OS/2, be a misquote? Oh God, I'm

having WordPerfect flashbacks! I've heard of vaporware being used to provide a sense of security for customers, but this is criminal.

Murray Todd Williams
Fort Collins, Colorado
Via the Internet

Our interview with Cowpland accurately reported what he said. We passed Mr. Williams' letter on to Corel and asked it to reply. Here's what Fiona Rochester, the company's manager, media relations, wrote:

"At the time [of the interview] we were planning to release a 32-bit version of CorelDRAW 5 in May 1994, based on Microsoft's WIN32S specifications. We anticipated that once we had completed a 32-bit version of CorelDRAW 5, we would shortly thereafter spin off 32-bit versions for NT, OS/2, and possibly the Macintosh. As it became apparent that Microsoft's plans were not evolving as quickly as initially proposed, we had to pull back and instead prepare a 16-bit version of CorelDRAW 5 for market. In addition, our ability to deliver for OS/2 was, and remains, dependent on IBM's provision of adequate porting tools including filters, device drivers, and OLE emulation. IBM continues to work toward satisfying these requirements.

"Right now, we are aligned with Microsoft's plans for the release of Chicago. CorelDRAW 6 will be a 32-bit application that would be portable to other 32-bit environments. Corel's delivery of CorelDRAW 6 for OS/2 remains tied to IBM's resolution of the previously stated outstanding issues."

Dell details

I just wanted to clarify something in the June 1994 issue [Special Report, Off the Shelf]. The SCSI adapter used in the Dell OmniPlex system is based on a NCR 53c810 chip, not a NEC SCSI ship.

Also, while at the first customer ship we did not have an OS/2 SCSI driver available, that has now changed. New

continued on page 69

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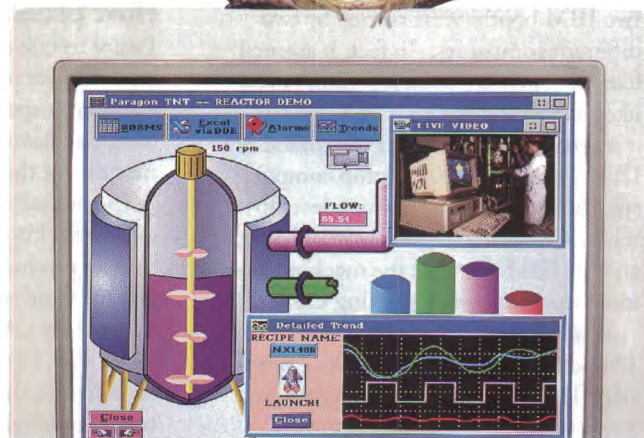
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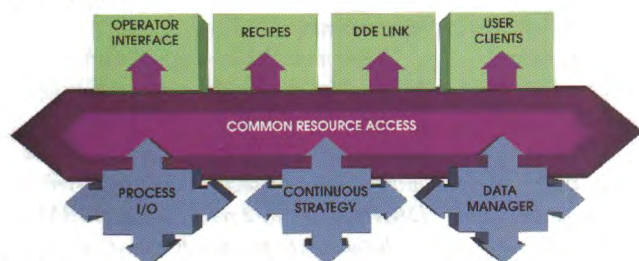


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BYTES & PIECES

News and trivialities, important and obscure

OS/2 storms Japan

Skyrocketing

Japanese interest in

OS/2 led IBM's Personal

Software Products division to add two last-minute shows in Japan to its Technical Interchange lineup. The shows were staged late last month in Tokyo and Osaka.

The rushed decision to sponsor the Japanese shows—in early July, PSP's show planners knew nothing about them—reflects PSP's determination to push OS/2 in Asia. Earlier this year, IBM Tokyo kicked off a big ad campaign, using the theme "OS/2: Run DOS/Windows."

Masaka Esaki, a Tokyo-based marketing manager for IBM, reports that in Japan, as in the U.S., interest in OS/2 is on the rise. "Last year, we sold 100,000 copies of OS/2," she said; this year "we should double that." Reflecting that interest, Softbank Publishing, a Japanese company, in May published the first issue of its new bimonthly magazine called *OS/2 Magazine*. And according to the IBM Independent Vendor League, five OS/2 book titles will be published in Japanese this month.

Capitalizing on this growing popularity, two PSP executives, Dan Lautenbach, director of worldwide marketing of personal operating systems, and John Soyering, director of strategic relations, traveled to Tokyo in May to address a meeting sponsored by the Japan-based OS/2 Consortium, a group of some 140 OEMs including Toshiba, Lotus, and Borland.

A major part of the IBM campaign is the translation of OS/2 book titles into Japanese and Chinese. Soyering has been working with Van Nostrand Reinhold and International Thomson Publishing Co., Japan (VNR's sister company), to promote the translation project.

The preload perplex revisited

A broad OEM commitment to preload

OS/2 on state-of-the-art machines would send the message that IBM has finally committed itself to an aggressive campaign to narrow the market gap between it and Windows.

That's why we were more than a bit interested when we spotted an ad in several trade magazines trumpeting OS/2 preloads. (The same ad is running in this issue.) Headlined "Now inside specially marked boxes," it urges buyers to look for "boxes" that offer OS/2 preloaded. According to the copy, more than 50 major PC makers offer OS/2. It names IBM, AST, Dell, and HP.

Hmmm, we thought. PSP President Lee Reiswig told us not long ago [*OS/2 Professional*, June] that he doesn't anticipate any major preloading deals this year, and when asked about 1995, he replied, "Boy, I hope so." So in early July we called the four companies named in the ad. Three told us OS/2 was not available factory installed. (A Dell spokeswoman insisted OS/2 can be ordered for \$179, but telephone sales employees disagreed.) The fourth, IBM's own PC Co., told us we could order a 486-66 with OS/2 preloaded, but not a Pentium-based PC. We also called the 800 number offered for consumers who want to "find out more about OS/2 preloaded." The number is that of the IBM Software Store, and the person who answered the call asked if we could fax a copy of the ad so they could take a look.

Shortly thereafter, IBM was once again speaking with two voices about preloading when Senior VP Ellen Hancock, who sits on IBM's Corporate Executive Committee, told a handful of Boston-based editors at a Database Client/Server World roundtable that the PC Co. would later this year begin preloading WARP, the 4mb version of OS/2 for Windows.

Hmmm, we thought. We tried to confirm this tidbit, first reported by *PC Week*. A spokesperson said that while Hancock may have said that, it was not an official statement. So we called the

PC Co., where executives seemed to know less than we did. Their attempt to clarify the situation took the form of a statement saying, "We offer customers a choice today; we will continue to offer customers a choice. However, a 4mb version of OS/2 is something we think our customers will be very interested in." A spokeswoman for the PC Co. also insisted it currently preloads OS/2. (That's technically true. But it's enlightening to browse through the pages of the IBM PC Direct catalog.)

All of this may be good news. Perhaps Big Blue really has already decided it is going to preload OS/2—but it just don't know it yet.



Bargains in Raleigh

The previous item notwithstanding, the PC Co. does provide off-the-shelf PCs preloaded with OS/2. But you won't be able to get any cutting-edge machines, and you'll have to call North Carolina to get them.

Raleigh, North Carolina, home of IBM's largest PC manufacturing plant, is also the site of the IBM Factory Outlet, an eight-month-old "cost recovery" retailer that liquidates discontinued and refurbished IBM computers and software.

Through an 800 line (800-426-7015) or the outlet itself, consumers can purchase discontinued and refurbished PCs and software. While the outlet does not yet offer Pentium-based computers, buyers can purchase several Value Point models with OS/2 2.1 installed for up to 50 percent less than the original selling prices.

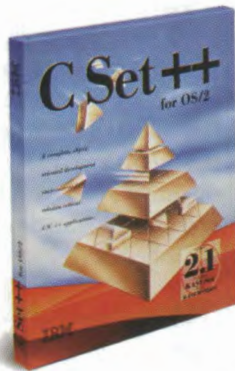
The outlet also carries OS/2 for Windows, but with an eyebrow-raising \$134 price tag. This and other recent versions are not discounted because, as one insider put it, "IBM is deadly afraid of undercutting the retailers on current products." But if you can do without today's latest and greatest, yesterday's is available for a fraction of its original price—and with OS/2 preloaded. ♦



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OS/2 AVAILABLE THROUGH
EXPRESS

IBM

Playing Games

BY WILLIAM F. ZACHMANN

OS/2 certainly isn't wildly successful yet, but now even its most determined enemies are having a very difficult time claiming it's dead. A CRN/The Gallup Organization Inc. survey conducted in April, for example, showed OS/2 in use at slightly more than one out of three business firms (35 percent of those with sales of \$12.5 million or less, 36 percent with sales of \$12.5-\$30 million, and 33 percent with sales of more than \$30 million)—up sharply from only three months before. The OS/2 installed base is still relatively small—not more than 4-5 percent of all desktop systems in use—but it is steadily gaining market share.

From the camps of OS/2's critics, what was once total dismissal of OS/2's prospects has given way to grudging acknowledgement that OS/2 will be around for a while. Instead, their claim has become that OS/2 is a niche product—and that niche is a very small one. In that, they have been joined by some who describe themselves as OS/2's friends.

The "OS/2 as niche product" argument takes several forms. All of them have in common, however, the claim that OS/2 is really suitable only for some very limited market segment and ought not to be promoted or considered outside of that niche. This argument often is presented in the form of a suggestion to IBM as to how to market the product. There is, for example, the assertion that OS/2 is really suitable for use only by a relatively small number of large organizations with information processing infrastructures closely tied to IBM mainframes. Proponents of this view say IBM ought to target for OS/2 only the top 500 or so "Blue" accounts and pretty much forget about trying to sell it to the rest of the world.

A variation on this theme is the claim that OS/2 is really suitable only for a small number of users with special requirements "above and beyond" those of ordinary users. Unless someone is, say, a software developer, network administrator, power user, or the like, these people say, there is really no

reason to promote OS/2 for that user.

Such recommendations, however, are counsels of defeat. They are based on a failure to understand the true strengths of OS/2, the real weaknesses of its competitors, and how the industry is changing.

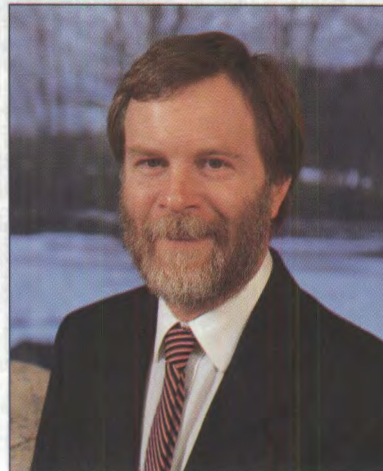
In fact, OS/2's greatest potential lies neither at the large "Blue" shops nor on the souped up machines of power users. It isn't even with ordinary business users of desktop personal computers. OS/2's greatest promise is in the fastest growing, hottest and most dynamic segment of the industry today and for the rest of the 1990s: "digital edge" infotainment applications for the home.

This isn't a new consumer "software" sector (remember, movies are software too) so much as it is a home entertainment marketplace that has matured faster than the technology to support it. As a result, we have cutting edge games and interactive educational software being run under Windows 3.x—something like driving a Ferrari on an unpaved dirt road—and game players dropping down into DOS to get decent hardware support. Software Toolworks' MegaRace would be a lot hotter under OS/2; so would Doom and the embarrassingly Stone Age games on the

Sega and Nintendo platforms.

As useful as OS/2's robust, fully preemptive, multitasking, multithreaded capabilities are for business use, they will ultimately be far more useful—no, make that downright *essential*—for this emerging consumer market. The size of the installed base of personally owned systems with CD-ROM drives, sound cards, audio input, high resolution video-capable graphics cards and monitors, and sufficient disk space and memory to support all that stuff, is shooting upward like a rocket taking off.

The problem is that the mass-market operating system foundation presently in place, DOS plus Windows 3.x, just hasn't got the "right stuff" to complete the journey. It's simply not powerful or sophisticated enough to deliver the real

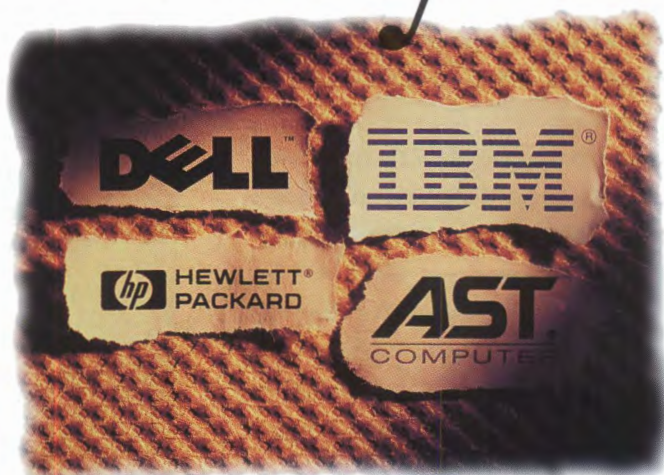


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ZACHMANN'S VIEW

potential of digital edge computing.

Something more than just cooperative multitasking, for example, is required to create a solid operating system foundation that can juggle multiple sound cards, desktop video, digital signal processing on input and output, and exotic yet-to-be invented real-time connections, keeping them in synch with one another. That means something more than an operating system that falls back into cooperative multitasking every time it drops back into 16-bit code—something more than Chicago. Notwithstanding Microsoft's promises along the lines of "Windows for Games" (or whatever it gets called), Chicago's flaky architectural foundations are going to be every bit as much a problem for it in the long run as were Windows 3.x's.

Windows NT, like OS/2, really does have an underlying architecture adequate to the job. Even in its newer, slimmer incarnation as Daytona (Windows NT 3.5), however, NT still weighs in with resource requirements that make even OS/2 2.1 appear svelte. Having the resources to support Daytona is a stretch even for the high end office desktop, let alone for the home. In addition,

NT's backward compatibility limitations remain an obstacle to acceptance, even in the relatively resource-rich office setting. It has no prospects of widespread use on home systems for a long time yet.

With the new "Performance" version of OS/2 for Windows, however, OS/2 is already a serious contender for the home as well as for the office desktop. The new 32-bit graphics engine finally provides both the power and the speed necessary to support the user interface for hard core multimedia applications.

OS/2, in its current and near-future incarnations, is fundamentally a far better operating system for these interface-intensive recreation applications than anything Microsoft has to offer now or any time soon. IBM would have to be nuts to confine OS/2 development and promotion to Fortune 500 or high end niche markets. What IBM ought to be doing instead is convincing every hot new digital edge multimedia software startup to put its latest and greatest products onto OS/2. Doing anything less would be ignoring OS/2's greatest potential and frittering away OS/2's greatest opportunities. ♦



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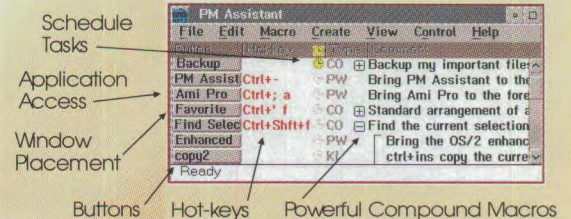
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SPECIAL REPORT

TUNING OS/2'S
DISK CACHES
CAN IMPROVE
PERFORMANCE.

HERE'S THE
INSIDE LINE
TO A BETTER
BOTTOM LINE.

CACHE AS

BY FRANK V. CASTELLUCCI
AND MARK B. FRIEDMAN

Dial into CompuServe, the Internet, Usenet, FIDO, or any of

the other places where OS/2 users gather. What questions and advice will you find posted most often—besides, that is, rhetorical questions that really are put-downs of Chicago or grumblings about IBM's latest marketing gaffe? Sure, installation hassles and driver problems top the list. But what's next?

Simple: Optimization. How do I tune my OS/2 machine to make ideal use of my 8megs of RAM and 340mb hard drive?

For some on the boards, talking tuning is the moral equivalent of comparing centers, or center fielders. Wilt vs. Akeem? Willie Mays vs. Ken Griffey Jr.? FAT vs. HPFS? 1mb cache vs. 2mb? But for the enterprise OS/2 environment, optimal use of resources is far more than ego—it's dollars-and-sense productivity.

One of the people we deal with on tuning issues is responsible for an enterprise network that includes 1,600 OS/2 servers. Needless to say, that person's core job responsibility involves getting the most from the installed base. In that IS environment even the most minor software or hardware

CACHE CAN

productivity
acquisition, multiplied
across that number
of machines, equates

to a serious amount of money. The reality is that you have to provide some form of analysis and cost justification before your organization will approve an expenditure of that magnitude.

Some authorities advise throwing in the towel, since tools comparable to those used for mainframe-class analysis simply do not exist for enterprise networks. We disagree. While managing a decentralized systems environment is more challenging, it is possible to develop tools and metrics with which to evaluate system changes.

One of the strengths of OS/2 is its flexibility. But that also means that entropy

SPECIAL REPORT

and the tuning attempts of your power users will interact to assure that your desktops aren't operating at peak efficiency.

That's where you come in. It goes without saying that there is no right answer for everyone. The only way to truly optimize your standard desktop systems is to find out what works on *your* machines with *your* workloads.

Fortunately OS/2, like the mainframe operating systems it descended from, provides comprehensive performance measurement data collection facilities. Using that data to measure the system before and after tweaking a tuning parameter, it is possible to determine which adjustments help efficiency. The bottom line benefit is a more efficient machine that also may last longer, which saves money and improves tempers and promotion prospects.

Any systematic approach to performance and tuning will rely on the use of a repeatable benchmark. The technique for evaluating the impact of a tuning parameter change is simple: Run the benchmark and measure the system. This establishes a baseline measurement. Next, make the change you contemplated and rerun the benchmark. It is often useful to evaluate a series of changes so that you can estimate the range of performance that a tuning parameter influences.

Optimizing the Disk Cache

One of the most important tuning options in OS/2 is the use of its built-in disk caching software. The cache reduces the amount of time it takes the system to access information on the disk by storing frequently used data in RAM rather than retrieving it repeatedly from the slower hard disk. Improving the speed of I/O often produces a substantial overall performance improvement. Each of the file systems, FAT and HPFS, has its own cache, controlled by the `CACHE` and `DISKCACHE` specifications in `CONFIG.SYS`.

Under most circumstances, the more RAM you use for disk caching, the better chance you have that the data requested from the disk is stored in memory, avoiding a time-consuming I/O procedure. However, the more memory you use for cache, the less you will have available for other applications that may need it, since the memory you dedicate to disk caching is reserved permanently for that purpose. Thus, it is quite possible to have too much of a good thing.

With its flat 32-bit memory model, OS/2 makes efficient use of memory resources. However, if you have an active desktop environment, you likely find that memory is often in short supply. The icons and other bitmaps that make the desktop so appeal-

ing also chew up memory. Applications, even when minimized, hold onto the memory resources they have acquired. It thus is relatively easy to overload real memory.

OS/2's segmented virtual memory operating system reacts to shortages of memory through *paging*: when memory is in short supply OS/2 attempts to find code or data pages in memory that are idle, replacing them with newly referenced segments that presumably have a greater likelihood of remaining active. In extreme situations when OS/2 is forced to remove active segments from memory, application performance decreases because OS/2 must fetch the needed active segments from disk.

Recognizing this, OS/2's default cache sizes vary with the amount of memory on the machine. But how can you tell if the default cache sizes are the right settings for your machine with your workload?

The optimal size of a memory resident disk cache is large enough to speed up disk I/O and not so large as to slow down the system through excessive paging activity. (Incidentally, similar considerations apply when you are sizing the number of FAT directory or Print Monitor buffers in OS/2. Setting `PRINTMONBUFSIZE` too high speeds up printing, but reduces the amount of storage available to other applications.)

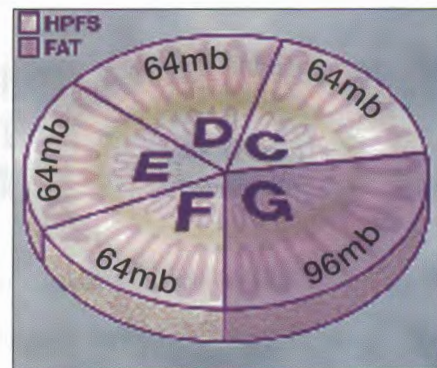


FIGURE 1 How the test machine's hard drive was partitioned

A less obvious trade-off in the use of a memory-resident disk cache is that the CPU consumes more time maintaining and searching a large cache. Thus, CPU-intensive tasks may suffer performance degradation when running concurrently with I/O-intensive workloads. Large caches can easily exacerbate this situation by speeding up I/O-bound work and increasing contention for the CPU. The goal of tuning is to achieve a balance between the size of the cache and the performance gains that can be achieved without impacting the system through excessive paging or CPU activity.

SPECIAL REPORT

OS/2 set the default cache sizes for our 16mb test bed machine to 1mb, split equally between the active file systems. Prior to performing this systematic analysis of cache performance of these systems, we had it configured with a 1mb FAT cache and a 1.5mb HPFS cache. After testing, we reduced the FAT cache to 256kb and the HPFS cache to 512kb. We found we could save 1.75mb of memory dedicated to disk caching without sacrificing any performance.

The Tuning Game

Universal benchmarks are of limited utility in optimizing a particular computing environment. The benchmark you select should be one that makes sense for you—something that is representative of the work you care about on the machines being evaluated. The benchmark we used was a standard compile and link of a program written in C++.

You can use simple command batch files or REXX procedures to run your benchmark. Most importantly, the benchmark must be repeatable, so that the only change from one run to the next is the parameter under evaluation. Of course, for changes to CONFIG.SYS parameters to take effect, you must reboot OS/2. Unfortunately, this makes the benchmark process rather tedious.

The system we tested was a Dell 433SE EISA 486DX-33 with 16mb of RAM running OS/2 2.1. We used the Pegasus Tools CacheMon utility version 1.10 with 21PEGFIX.ZIP fixes applied, which can be downloaded from almost any OS/2 bulletin board, including ours (914-245-1561). Our hard drive was partitioned as shown in Figure 1. SWAPPER.DAT is set to start at 8mb and is located on the G: partition.

Our evaluation machine works primarily as a development platform. We use IBM C Set ++ version 2.1 with the IBM OS/2 Developer's Toolkit V2.1, all loaded on the 96mb FAT G: partition. Support libraries and header files reside on E: and F:. The first test focused on setting the FAT cache size for G:.

We performed the testing by running the compile and linking of a C++ source program that generated a 300k executable file. This operation runs for several minutes. The system activity performance statistics were recorded by the Pegasus Resource Monitor for OS/2, and we used the Pegasus Tools CacheMon program to measure cache performance, with each collecting data at five second intervals. After each test, we rebooted with a different cache setting. All the performance statistics that had been collected were then processed using the Pegasus REXX Extension.

The FAT Cache

Figure 2 shows the performance impact of varying the FAT cache

size from 64kb to 512kb. The top line shows the cache hit ratio—the percentage of disk segments retrieved from disk compared to the total number of disk segments for which I/O requests were issued. A 90 percent cache hit ratio means that nine out of every 10 I/O requests were satisfied from memory, in each case avoiding an I/O to disk. The results show that even modest amounts of cache produced a significant savings in I/O. At 64kb, the cache hit ratio was above 80 percent and at 128kb the hit ratio increased to more than 90 percent. Adding more cache memory above 128kb resulted in minimal improvement, however.

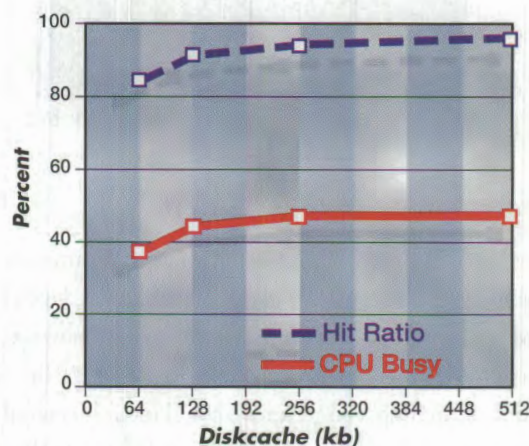


FIGURE 2 Hit ratio and CPU utilization as a function of FAT cache size

This sort of memory utilization curve is typical of disk cache: a rapid increase in performance up to some optimal level where the curve starts to flatten out noticeably. At some point the rate of return from adding memory to the cache will dwindle. This is the point where you want to set the cache size: high enough so that small fluctuations in the workload do not cause large fluctuations in performance, but low enough that you are not wasting memory that could go to other applications.

Figure 3 shows the time it took to complete the compile-and-link benchmark. Doubling the cache size from 64k to 128k knocked 20 percent off the elapsed time. Larger cache sizes resulted in minor improvements. Again, there was no measurable difference in elapsed time between the 256k and 512k trials.

Figure 2 also shows CPU utilization during the test. The increase in CPU utilization results from the improvement in caching—the application is waiting less for disk I/O and as a result the same CPU load is concentrated into a shorter interval. (We verified that the amount of CPU time required to run the application remained constant throughout the benchmark by calcu-

SPECIAL REPORT

lating CPU time consumed as the product of utilization in Figure 2 and the elapsed time from Figure 3. The total amount of CPU time consumed remained constant at about 54 seconds worth.)

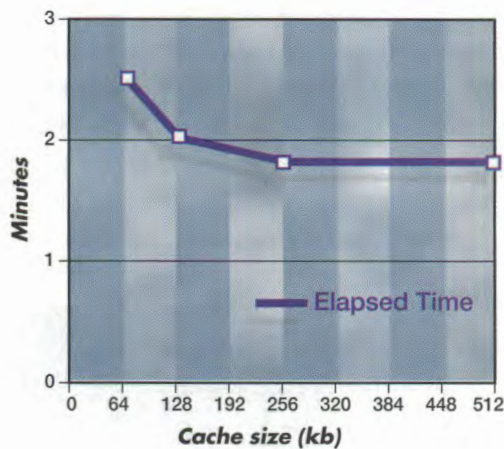


FIGURE 3 Elapsed time vs. FAT cache size

Note that a compute-bound application that saturates CPU usage would negatively impact cache performance. Until multi-threaded applications become more prevalent, however, this remains more of a theoretical problem than a practical limitation. In addition, searching a larger cache could incur increased CPU overhead, but we do not see any evidence of it here. Increased CPU overhead to search a larger cache, if it occurs, can also be offset to a large degree by the reduction in the amount of CPU time the operating system requires to process I/O interrupts that result from cache misses.

When the cache hit ratio leveled off after 256kb, CPU utilization actually declined slightly. It would be interesting to see to what extent throughput might degrade with further cache over-allocation, but we can only speculate here because we did not run such a test. If other processes were active concurrently, there is certainly the potential that improved cache performance would simply move the bottleneck from the disk to the processor. That is why it is always important to evaluate isolated performance metrics in a larger system context.

Increased Paging

Figure 4 shows the increase in paging activity that results from increasing the FAT disk cache size. Since memory used for the disk cache is permanently allocated, there is less memory available for OS/2 and other applications. That can result in increased paging when the memory devoted to applications saturates. The effect is more noticeable under OS/2 than it is under Windows 3.x, where memory above 8mb or 12mb often goes wasted—typ-

ically, Windows 3.x runs out of memory in the 64k system GDI segment long before memory is filled. OS/2, on the other hand, has no trouble utilizing 16mb of memory or more.

In Figure 4, note the large difference between the number of page-outs and page-ins. Page-outs occur as application memory begins to saturate. OS/2 memory aging routines identify idle pages and remove them in favor of newer, active pages. The performance impact of paging out older, idle pages is normally minimal. However, as the system removes ever more active pages, the likelihood of a subsequent reference—a corresponding page-in event, or *page fault*—increases.

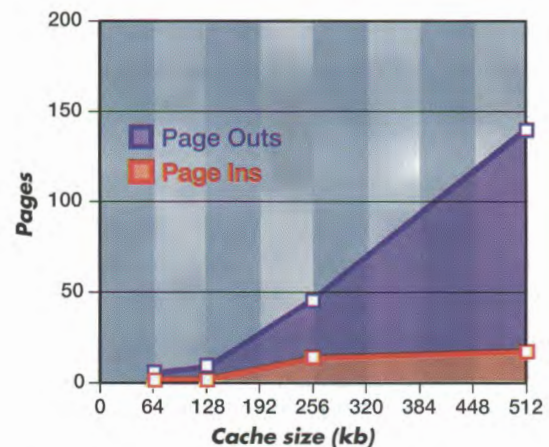


FIGURE 4 Paging activity vs. FAT cache size

Too many page-ins can slow running applications to a crawl. The number of page-ins generated running with 512kb of FAT cache was about one page fault every five seconds, so the impact on the application was still negligible. Increasing the cache size further would cause an even higher page fault rate, leading to noticeable performance degradation.

Increased page fault activity may also reduce the number of ready threads. Threads that are waiting on a page fault are blocked. This is the likely explanation for the slight reduction in CPU utilization when the cache size was increased to 512kb. Rather than working toward useful ends, the system begins *thrashing*, a state of excessive paging that reduces application throughput.

SWAPPER.DAT was allocated to the G: partition we were caching, creating potential disk contention between the paging system (the swap file) and other activity on the drive. With the 512kb FAT cache, paging activity to the G: partition was about one I/O per second, so this source of possible disk contention was still at acceptable levels. The situation would be worse if SWAP-

SPECIAL REPORT

PER.DAT were allocated to a different partition—then each paging I/O would involve longer seeks. In optimizing an OS/2 system, one is constantly reminded that even simple changes can have complex side effects.

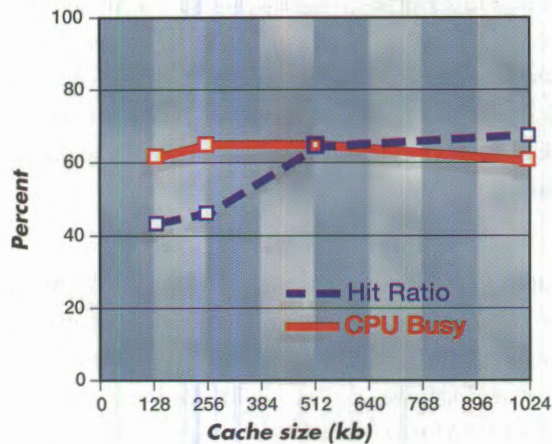


FIGURE 5 Hit ratio and CPU utilization as a function of HPFS cache size

It is clear from our testing that a 256k FAT DISKCACHE allocation is optimal for this environment. Because of the small deltas in the cache read hit and elapsed time above 256k, larger cache sizes provided little or no overall improvement in performance. Over-allocating FAT cache leads ultimately to degraded system performance as demand paging occurs. The remainder of the benchmark runs were made with a 256kb FAT cache.

The HPFS Cache

In the second stage of this evaluation, a similar benchmark workload was executed repeatedly as the HPFS cache size was varied from 128kb to 1mb. (OS/2 restricts HPFS cache size to a maximum of 2mb.) As noted in Figure 5, cache performance rose sharply between 256kb and 512kb, then improved more gradually at 1mb, where we cut off the test. CPU utilization also increased, again reflecting faster execution time. Meanwhile, the total CPU time usage for each benchmark run remained constant at approximately 51 seconds.

Once again, we could find no evidence that searching a larger cache resulted in noticeably increased CPU overhead. Elapsed time, shown in Figure 6, leveled off after 128kb when all the elapsed times were within five seconds of each other, a small enough difference that it could not be accurately detected using our five second sampling interval. With the FAT cache trimmed to 256kb during the HPFS evaluation runs, no paging occurred.

Lazy Write

The High Performance File System cache provides more extensive statistics than the FAT cache. Two of these additional statistics, shown in Figure 7, are average read and write I/O response times.

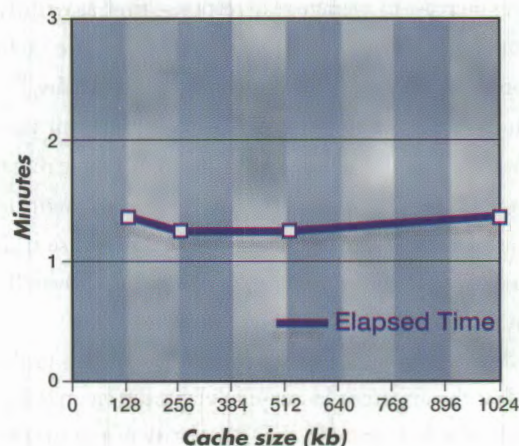


FIGURE 6 Elapsed time vs. HPFS cache size

HPFS was evaluated with Lazy Write enabled. Lazy Write is a form of write-back caching in which the I/O operation is deferred until a period when the disk is idle. DISKIDLE, the cache parameter that determines the amount of time a disk must be idle before write I/Os are issued, was at the default setting of 1,000 milliseconds.

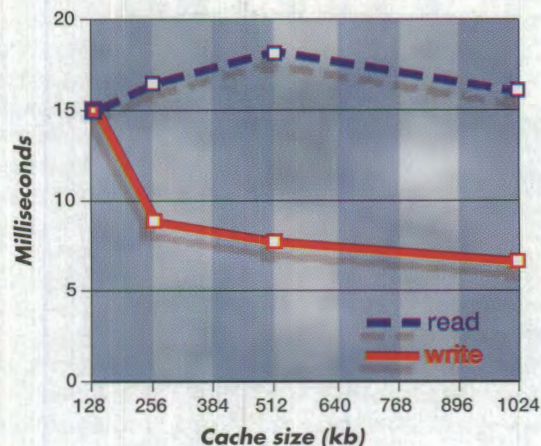


FIGURE 7 Read and Write I/O response time as a function of HPFS cache size

Our benchmark test left little room for Lazy Write, however. In any kind of intensive, long running process (the benchmark suite here executed for about 80 seconds) the disk is likely to be active continuously, leaving no disk idle times of one second duration when writes can be performed without subjecting current

SPECIAL REPORT

I/Os to possible disk contention. The situation should improve as hit ratios increase, but in this case we were only able to obtain hit ratios of less than 70 percent, even when devoting 1mb to cache.

Note the sharp drop in write I/O response time when cache size is increased from 128kb to 256kb. Note further the corresponding increase in average read response time as write response time improves. This occurs because improved write caching initially forces active read-only segments out of the cache. The write cache hit percentage then improves, read cache hit percentage degrades, and the overall average disk response time remains flat.

Between 256kb and 512kb, the improvement in write response time was offset by the degradation of read response time. Both write and read response time improved at 1mb. Overall elapsed time for the benchmark increased, however.

We do not have a plausible explanation for this at this time, except that the apparent increase in elapsed time may have been the result of a deficiency in the granularity of the measurement data. OS/2 performance data was logged at five second intervals. It is thus not possible to resolve job elapsed time differences at any granularity finer than five seconds. Each execution duration

was approximately the same, plus or minus five seconds—the length of time between data collection intervals.

All we can say, then, is that turning on Lazy Write does not guarantee better overall I/O response time. All caching is performed at a 1,024-byte sector level, and only so many sectors can fit in cache. There is no guaranteed benefit from Lazy Write unless sectors are read after being written or writes can be posted to disk during idle time. As always, the best recommendation is to look at the performance data and determine the best settings for your workload.

The Bottom Line

Although our testing showed that the default OS/2 settings were close to optimal for our setup, we were able to obtain equivalent performance with less cache memory deployed. Compared to our previous settings, we saw we could eliminate approximately 1.75mb of RAM that we had been using for disk cache without compromising performance, and thus were able to free almost 11 percent of the machine's memory for other uses.

The DOS FAT file system yielded much better results from caching than did HPFS in the environment we tested. Further

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testing is required to determine if the benefits of HPFS are confined to file and network server applications.

Our results suggest that the average OS/2 desktop user can forego using HPFS without feeling guilty that he or she is somehow sacrificing stupendous performance improvements that are there for the taking. The choice between FAT and HPFS may then be made on the basis of features (such as long filename support) rather than performance.

Until native OS/2 desktop applications become more widespread, HPFS remains the file system of choice for server and database environments, where it has proven its mettle many times over. But it is also worth noting that HPFS cache size is constrained to a maximum of 2mb, no matter how much RAM is available, where the FAT cache is not. A 64mb OS/2 SMP server could utilize large amounts of FAT cache, but never more than 2mb of HPFS cache.

We are convinced that professional quality performance and tuning tools make a significant difference in this type of work. Fortunately, you do not have to evaluate OS/2 tuning changes in the dark. The OS/2 kernel provides reliable performance metrics

on disk caching, processor utilization by programs and threads, I/O response time for all peripherals, and many other useful statistics that can be collected with minimal impact and overhead.

Tools like IBM's SPM/2 performance monitor and the Pegasus OS/2 desktop monitor product used here are available to access these statistics and record them for later analysis. The challenge for OS/2 professionals is to gain experience using these tools to understand complex OS/2 environments. As we begin to record and share our experiences tackling real world performance problems, even basic ones like disk cache sizing, a body of knowledge accumulates that allows us to solve ever more complex configuration and tuning problems. ♦

Frank Castellucci, president of C.O.L. Systems, Inc. of Amarwalk, New York, is a leading authority on OS/2 performance and the developer of the Pegasus Resource Monitor for OS/2 and the OSRM2 network performance database for OS/2 servers and workstations. Frank's CompuServe ID is 72261,2700. Mark Friedman is a principal of Demand Technology, Inc. in Naples, Florida. He lectures frequently and has published dozens of articles on performance topics. Mark's CompuServe ID is 71534,332.



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The Plastic Software Library

The future is thin, shiny, plastic, and holds 600mb of goodies.
All you need is a CD-ROM drive.

BY HERB TYSON

The label says *OS/2 Professional CD-ROM*, Volume 1, Number 1. So here I sit, with nearly 600 megabytes of software and information on a thin plastic disk—more than 1,200 programs. After days of spinning this thing, rummaging through hundreds of descriptions and sampling here and there, I still haven't scratched the surface. I've installed and tested about two dozen of the programs. Even at that, however, it's still just 1/50th of what's on this thing.

This is the future. Unlimited choice is just over the horizon, and seemingly bottomless CDs are just the beginning. Do you remember, just yesterday, struggling with a stack of 10 to 20 diskettes for a single program? Those days are gone forever. Software collections on CD can offer hundreds and hundreds of programs on a single piece of plastic.

Or perhaps you're among those who've visited countless computer stores, searching the shelves for OS/2 programs, and still come up nearly empty. Well, Virginia, there are indeed programs for OS/2. Sit back and take a look at more than a thousand of them.

Navigation

Exploring a collection of more than 1,200 programs can be more than a little daunting. Fortunately, the Kelly DATA Library, which makes the *OS/2 Professional CD-ROM*, provides tools to help you find your way around. The entire disk of programs, along with descriptions, titles, authors, and licensing information, is organized into a combined database and installer. The control program lets you sort, view, and search the database. Looking for "music," for example, I find two entries: *Multi-threaded MOD Format Music Player* and *ACCU Music System for OS/2, Adlib Music Player*.

One of the more useful ways the contents can be organized is

by program category. Major categories include COM Utilities, Disk Utilities, Documents, System Utilities, WPS Applications, WPS File Utilities, WPS Games, WPS Graphic Applications, and WPS Utilities. Beyond that, the categories go even deeper. There are BBS Utilities, Archive Utilities, Drivers, Editors, Patches (various OS/2 fixes), LAN Utilities, Multimedia Apps—the list goes on and on.

It's In There!

If, like me, you're an inveterate BBSer, you may well have discovered some of the mega-BBSs for OS/2 by now, such as Pete Norloff's premier OS/2 Shareware BBS, the Fernwood BBS, and IBM's main BBS in Atlanta. If you frequent those BBSs, you likely have seen and have access to much of the variety and intensity that's available on the *OS/2 Professional CD-ROM*.

Even so, the advantage of having these on CD is that you don't have to spend hundreds of hours downloading the programs. I recognize many titles that I've seen scroll by during the past few months, many of which I decided not to download at the time, often because the files were too big or I just didn't have the time.

With a 600mb CD, however, it's more like having a personal library. It affords you the time to examine the offerings at your leisure. If you find something you like, you can then go back to your favorite BBS to make sure that the version on the CD is the latest and greatest.

On the Volume 1, Number 1 edition of this CD, I see a number of programs I've never heard of previously. I also see names I recognize from the OS/2 Shareware BBS and from CompuServe: KWQMail, the OS/2 2.11 Service Pak, a better CD-ROM player, replacement video drivers for OS/2, a collection of .WAV file excerpts from Dave (Mr. OS/2) Barnes' road show, something called "Fix for DOS IPE PJ08996," and a talking

alarm clock. This is just the tip, of course; the rest of the iceberg is still waiting for me to catch up.

For OS/2 users on an economy drive, you may well find here every piece of software you'll need. For word processing, there's a set of files that adds a thesaurus and spelling checking to EPM (the Enhanced PM editor that comes with OS/2). There's a non-GUI spreadsheet program (slightly more complete than the spreadsheet applet that comes with OS/2), a couple of database programs, and a bevy of personal information managers.

Do you need a math tutor? There's a shareware program called PM Math that helps sharpen your kids' math skills (or your own). You can set the level of difficulty, specifying the kinds of skills that you want to work on. For programmers, you'll find tons of C program source code. You're sure to find at least a few wheels you won't have to reinvent.

Not Entirely Flawless

As with most prospective panaceas, this one, too, has a few lapses. One of the most annoying is not being able to pick up where you left off. Unfortunately, the only way to do that is to carefully arrange the file sorting and viewing exactly as you had it before.

Another chink in the armor is immediately apparent when you take the CD out of the package. There's a piece of paper that tells you that the README.TXT file and the INSTALL.EXE program that are on the root directory of the CD aren't any good. Instead, the piece of paper directs you to other copies of README.TXT and INSTALL.EXE that are in the \KELYDATA subdirectory. Excuse me? If they knew enough to put *good* copies on the KELYDATA directory, then why didn't they know enough *not* to put *bad* copies on the root directory? Apparently, it's a lot easier to add files to a CD than it is to delete them.

A more sinister-looking problem was the presence of several disturbing-looking icons when I sorted the CD database by Category. Floating to the top—like bodies on the Hudson—were two nasty-looking gremlins bearing the initials HIV. "Uh oh!" I said, wondering if the Trap D I'd experienced moments before was somehow connected. Further investigation revealed these "non-tracked" icons were nothing more than harmless leftover icons associated with a group of anti-viral programs on the CD. Still, you have to wonder about how and why just those two icons happened to escape. Why not two multimedia icons? In any event, they were utterly harmless. At least, *I hope so!*

Of course, not all of this software is free for the taking. The

OS/2 Professional CD-ROM does make it available to you—but licensing is a separate matter. Many of the programs actually *are* "Freeware" or in the public domain. This means that all you need is enough disk space to hold it.

On the Honor System

Much of the software on the CD, however, is Shareware. Shareware—just in case you've been living in a cave somewhere—is an economical honor system for distributing software. Programmers offer the fruits of their efforts for you to try, making their wares available on BBSs, mega CDs, and any other method they can think of. Users who work with the software beyond a reasonable (sometimes explicitly stated) period of time are honor-bound to ante up a shareware fee.

Licensing fees typically vary from \$5 to as much as \$100, depending upon how much the program author thinks a satisfied user might be willing to pay. Some programmers trust the honor system. Others, however, rigorously enforce the "reasonable" time period by disabling a program after a certain number of days or after a certain number of times the program has been executed.

Still other offerings are what's called DemoWare. Sometimes also called CrippleWare, DemoWare programs are limited function versions of commercial software—such as PMComm and Golden CommPass. Programmers attempt to provide enough functionality for you to sample the look and feel, but not enough that the program is as useful as the full version. Clearly, the goal is to leave your mouth watering for more.

Some go too far, of course. One program has a pop-up box that pesters you as often as every 15 seconds, making the product nearly impossible to try out. This places it into another category of try-before-you-buy software called NagWare.

Consider the CD a fast alternative to tying up your phone with a modem for several weeks. With the CD, at least you don't have to suffer the indignity of spending hours downloading software only to discover you can't use it.

Get a CD-ROM Drive—You Won't Regret It

The one barrier for many users is that they don't yet have CD-ROM drives. The time for hesitation, however, is past. In addition to tapping into the ability to sample thousands of programs on CD, you'll also be able to speed up the installation and setup of OS/2, as well as other commercial programs that are now

HANDS ON

available on CD. Imagine installing OS/2 in just 15 minutes, rather than having to feed disk after disk for an hour or so. Or, imagine installing a full suite of applications in just five or ten minutes.

You don't have to imagine it. It's here now. And the only thing standing between you and it is a CD-ROM drive. So make sure your next system has one. Then sit back and get ready for the future.

The time when two floppies sufficed is long past. A year ago, I couldn't even spell CD-ROM. And now, I can't imagine computing without one. As the Graduate was told, the future is *plastic*. This is one trend you won't want to miss. ♦

Herb Tyson is a computer industry analyst and consultant whose clients include IBM. He is the author of several books, including Your OS/2 2.1 Consultant, 10 Minute Guide to OS/2 2.1, and the Word for Windows 6 Super Book.

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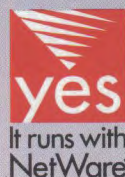
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SMART: How Sweet It Is

One UP's new code migration tool could come in very handy when developers find themselves with Win32 code and no environment to run it in.

BY MICHAEL S. KOGAN

Watch for a silver lining to the vapor cloud that is Chicago.

There is no denying the eagerness among software vendors for Chicago and the installed base it potentially represents. In the world of corporate users, though, feelings are considerably more mixed as IS executives try on the basis of too little hard information to assess how the Microsoft OS will fit into the enterprise.

Their concerns center around the features set of the gold code, its delivery timing, and its backward compatibility. They worry that Windows 4 may not turn out to be all it's slated to be, leading many to take a second look at OS/2 as the platform of choice to succeed DOS and Windows 3.x. After all, there are now more than five million copies of OS/2 in use. With version 2.1 and OS/2 for Windows, the operating system has made significant inroads in the enterprise. And with a hot update in the pipeline for this fall, the market for native OS/2 applications is potentially quite fertile.

One major obstacle to market growth has been a lack of tools for rapidly creating native OS/2 programs. But with the release of One UP Corporation's Source Migration Analysis Reporting Toolset (SMART), software developers have a cost-effective tool for quickly converting Windows programs into native OS/2 apps.

The SMART toolset consists of the SMART program, One UP's SourceLink editor, and utilities for viewing migration databases and converting resources. Depending on the migration database installed, the SMART program converts either 16-bit Windows or 16-bit OS/2 programs into native 32-bit OS/2 programs. Typically, 30 to 40 percent of the source code is converted automatically; the balance requires some developer assistance to complete.



Although SMART is not a CASE tool in the classic sense, it certainly does what CASE tools historically have done. Instead of forcing the developer to modify an existing source base to exploit a cross-platform CASE tool, SMART takes a damn-the-torpedoes, brute force approach by directly converting the bulk of the existing code and leaving the problematic sections for manual intervention. It also provides excellent source code analysis to enable better migration planning and schedule management, and as a bonus provides a robust development environment as well.

SMART's cost—\$14,995 for a single system license with one migration database and \$7,995 for additional system licenses or migration databases—is definitely an eye opener. And it comes with an aggravating copy protection device that must be attached to the parallel port of the licensed system. However, when compared with the tens and hundreds of thousands of dollars a developer could spend on additional staffing or longer development schedules, money spent on SMART may be smart money indeed.

Two Phase Conversion

After a simple installation, the user sets up the conversion process by creating a list of the source files to be analyzed and migrated. SMART then does its work in two phases. The first is an analysis phase in which the software creates a thorough report on the source code to be migrated and the migration effort itself. The second is a migration phase in which SMART converts the source files.

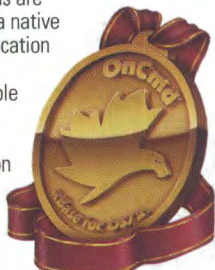
During the analysis phase, SMART searches the source code for *keywords*, the lexical elements that are used by a C or C++ pro-

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EYE ON THE MARKET

gram to access a platform's API. Keywords include functions, messages, symbols, parameters, structures, and typedefs. When a keyword match—a *hit* in SMART terminology—occurs during the search, SMART looks up the hit in the migration database, and extracts the migration information for the hit.

Each hit is assigned a migration category that SMART uses to classify the change required and rate its complexity. Categories range from simple literal replacements that can automatically be migrated, to more complex logic changes that require some manual intervention to complete.

After completing the analysis, SMART creates a report that contains file and keyword statistics. The source file details include the size, lines, lines of code, hits, instances (unique keyword matches), hit breakdown by category, and a metric known as *effort required*. The keyword details include the breakdown of hits, instances, and effort by category, keyword type, API area of expertise, and keyword.

The key to understanding the analysis data is interpreting the

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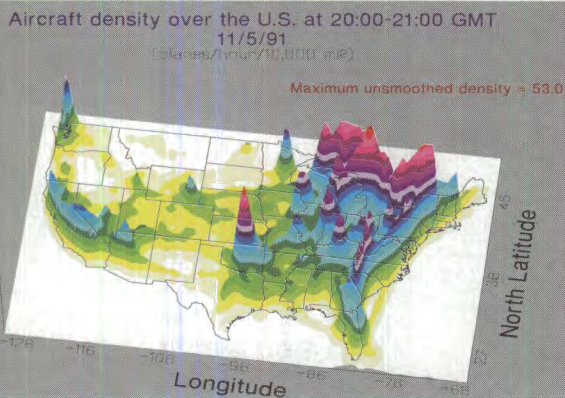
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effort metric. Each hit, regardless of category, is assigned a calculated effort value based on the complexity of the change and the amount of manual intervention and expertise required. After migrating several source files to determine an approximate time value for each effort unit, developers can use the effort metric to estimate development schedules and allocate development expertise.

The analysis report is also a useful tool in planning migration tactics. For example, implementing common functions for high effort items with high hit counts speeds migration by reducing the number of changes required.

In the second phase of the conversion process, SMART creates new source files that contain both the code changes it handled automatically and in-line comments with conversion information or proposed migrations of items that require manual intervention. You can customize the style and content of migration comments on a category basis, and also control the C preprocessor to manage conditional compilations. After com-

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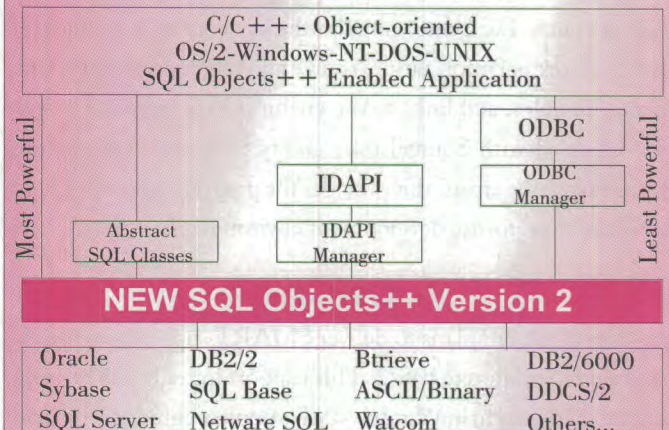
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pleting the porting process, SMART removes the inserted comments.

SourceLink's Hyperlinks

Although SMART can be used with any editor, One UP's SourceLink editor plays a key role in getting the most out of SMART. SourceLink has a powerful hyperlinking mechanism that allows the user to navigate rapidly through the analysis report, source files, migration database, and development tools.

Selecting the *create link database* option in the analysis or migration dialog tells SMART to create the database necessary to support the hyperlinks. Thereafter, whether you're editing the analysis report or the source code, you can move via mouse click to file and function definitions, or pop up a report of all references to any function or keyword in your code.

SourceLink also uses an included REXX macro to pass selected keywords to the SMART migration database viewer, which accesses the migration database to display the information for a selected entry. Each entry contains the keyword type, a migration category, textual information, source and target prototypes, templates, samples, and links to the on-line OS/2 reference manuals. Coupled with SourceLink's ability to spawn compilers and hyperlink to the errors, this provides the programmer with a powerful and easy-to-use development environment.

Outlook

In 4Q94 One UP plans to deliver SMART support for Win32, enabling migration to OS/2. This support initially will be based on the Win32 used in Windows NT, supplemented in 1995 with Chicago's Win32c. One UP is also working on future support for OLE-to-OpenDoc conversion, and support for other portions of the Win32 API for which there are no direct OS/2 equivalents, such as DDEML.

One UP's long term strategy is to develop a second generation SMART product that gives users the power to extend the number of platforms and languages supported. Code-named *Commander*, it will use a grammar-oriented model (à la Unix's Yacc) to define the input and output language syntax and semantics, and will have an open migration database architecture. This allows third parties to create customized migration environments that are not only cross-platform but cross-language as well. Commander will sport a more modular knowledge engine

that offers the potential for more rigorous automated translation.

One UP's new product, rather than the Micrografx Mirrors strategy, is the type of technology that IBM should have been backing all along to get OS/2 applications. Mirrors defined a stopping point, allowing developers to retain their Windows source code and keeping them from achieving high levels of OS/2 performance and exploitation. SMART defines a starting point, by creating true native OS/2 applications.

SMART has the potential to play a key role in the future for OS/2, not only by accelerating OS/2 native application growth, but also by giving IBM better leverage when considering whether and how to provide future Win32 compatibility.

Although Win32 compatibility for OS/2 would be great for OS/2 users, it alone will neither win any converts from the Windows market nor sway the hearts and souls of OEMs and ISVs. However, when Microsoft fails to deliver a quality Chicago release until sometime in 1995, ISVs that have been writing Win32 code will find themselves without an environment into which to sell their products. An aggressive IBM strategy that features OS/2 as a better Chicago that's been around for three years, combined with One UP's SMART technology, could convince previously reluctant ISVs and do a great deal for OS/2 growth in the desktop market. ♦

AT A GLANCE

SMART

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fax: (214) 620-9626

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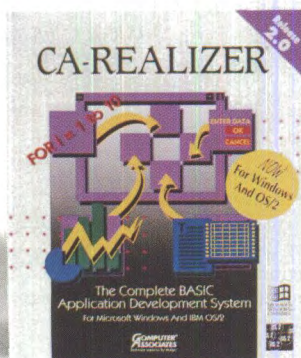
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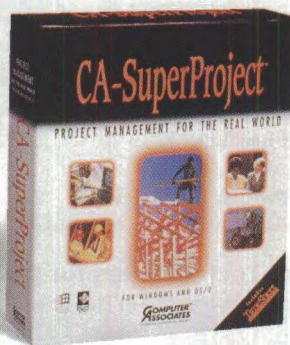
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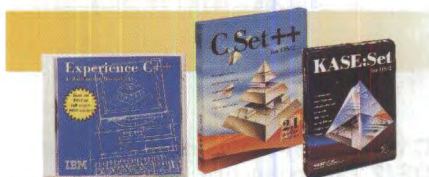
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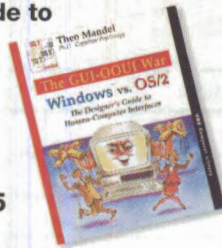
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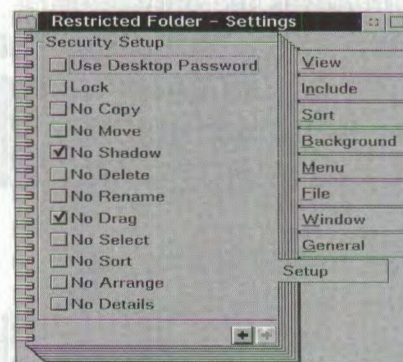
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DOT EXE

Software for OS/2

Ready, Set, C

IBM's premiere C development toolkit continues to set the OS/2 standard.

BY BRADLEY D. KLIEWER

There was a time when compilers were judged by speed—how long did it take to compile an executable? How fast did the resulting code run? With ever increasing computer speeds and program complexity, however, features and tools have become the driving force behind successful compilers. In the OS/2 arena, IBM's C Set ++ has become the standard by which other compilers are measured.

One such tool, the IDE (Integrated Development Environment), manages the transition from one development task to the next—the classic edit, compile, debug cycle.

In the early IDE days, the compiler vendor built each component of the IDE: if you bought a Borland compiler, you used a Borland editor, compiler, and debugger, all built into the IDE. In a modern IDE such as IBM's WorkFrame, the IDE integrates separate programs that control each task. For example, WorkFrame calls OS/2's built-in EPM editor, the C Set ++ compiler, and the IPMD debugger (which also ships in the C Set ++ package).

WorkFrame

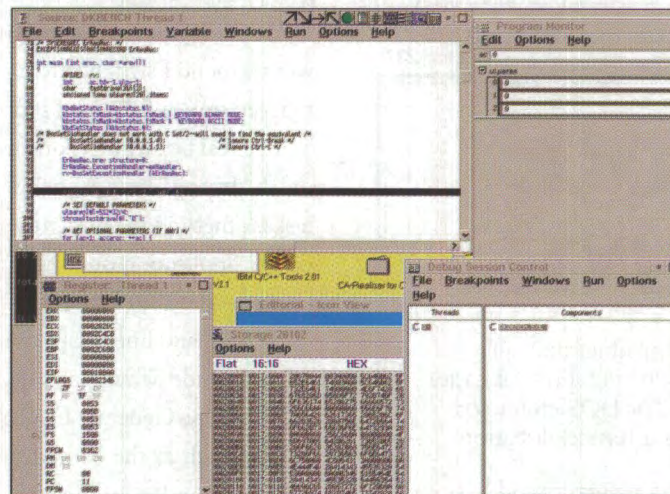
Of the improvements in C Set ++ 2.1, WorkFrame 2.1 ranks near the top. IBM replaced the WorkFrame 1.x Work Area-style operation with a true WPS-enabled interface. Note, however, that the revamped interface bears little resemblance to the older WorkFrame operations. Should you decide to switch, the learning time will be substantial, but worth the effort. Should your schedule preclude new studies, WorkFrame 1.1 remains an

optional feature in C Set ++ 2.1—the critical DLLs that manage the interface to command line parameter conversion remain compatible between both WorkFrame versions.

WorkFrame objects (called *projects*) look like typical folders on your desktop. You open the project to see a list of files, double click objects to load or run them, and right click on objects to see their menus. The objects inside these folders have different settings and behaviors than you might expect, however. WorkFrame has tailored the interface to a development system: when you right

click on an object, WorkFrame presents several new actions to choose from (such as BIND, DEBUG, EDIT, and COMPILE—the actual list varies according to the object type).

Curiously, IBM did not follow CUA guidelines in setting up these additional menu items. The menu selections appear in all capital letters and provide no accelerator keys—you must point and shoot with the mouse or keyboard cursor.



The IPMD debugging windows in C Set ++.

Every selection, in turn, may lead to a set of additional selections, often with a settable default. For example, you may configure WorkFrame to present a list of supplemental editors in addition to the default (similar in operation to file associations in the Workplace Shell). Although users would benefit from the consistency of CUA compliance, the WorkFrame interface is useful and efficient as is.

WorkFrame really must be experienced to be truly appreciated, but it is not without problems. The first task, installation and configuration, should proceed flawlessly if you follow directions and avoid unusual configurations (for example, we ran into some

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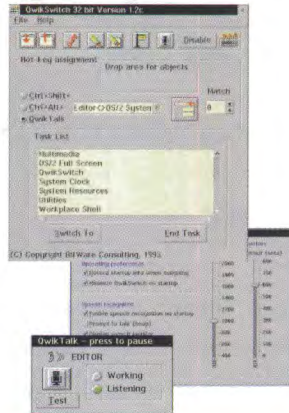
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44 OS2 Professional August 1994

DOT EXE

problems when trying to reinstall a LAN-installed configuration from CD-ROM). Normally, the various modules (the compiler and tools) detect WorkFrame's presence at install time and configure themselves and WorkFrame accordingly. However, if you make the mistake of installing modules out of order (WorkFrame should be installed before the compiler and tools), or the system somehow kills off your WorkFrame installation (as happened while we were testing an early version of DeskMan/2), configuring the WorkFrame can be a maddening process. Tweaking an already configured WorkFrame, on the other hand, is quite simple.

In addition to the reinstall difficulties, I also encountered some rather bizarre behavior. Sometimes, while selecting an action (such as edit or compile) from the WorkFrame, OS/2 reported that a detached process had terminated. Typically this had no effect beyond the generation of a warning message, but sometimes the compiler or EPM session would not load properly. The problem stemmed from the compiler (rather than WorkFrame) and a fix is available from IBM as CSD (Corrective Service Diskette) 8 or later. (CSD 9 was current as of publication.) As a work-around I switched to DeScribe as the default editor, which relieved some of the load problems with EPM.

The real beauty of WorkFrame is that it really doesn't do very much. It provides a launching point for program development tasks, a method for configuring those tasks, and a standard interface to application options. Each WorkFrame-enabled application provides a DLL that links notebook page settings to options on a command line. Instead of typing cryptic parameters such as /Ti to include debugging information in the object file, you simply check the Generate Debugging Information box. The specific tool (such as the compiler) supplies the information, WorkFrame provides an elegant interface. Furthermore, because WorkFrame assigns the real work to independent programs, you can replace any component (such as the EPM editor) with the tool of your choice, thus linking disparate tools into a cohesive whole.

The Compiler

A programmer's central tool, of course, is the compiler. IBM's C/C++ compilers stay abreast of the current technology. Most importantly, IBM provides a comprehensive standard class library plus extensions specific to a GUI environment. The latter set of extensions, called the User Interface Class Library, dramatically reduces GUI development time—once you fit the pieces together.

Our director of MIS remarked that GUI programming has a

DOT EXE

steep learning curve, but studying the UICL is like running into the face of a cliff. The greatest hindrance lies in the documentation. IBM supplies very few examples for the class definitions (and associated functions). As you browse through the reference documentation, you will see one syntax diagram after another with nary a line of code. This stands in stark contrast to the C Toolkit reference materials, which provide plenty of samples.

Fortunately, sample code appears in other manuals (and the sample programs). But this leads to some awkward juggling between windows. For example, if you use the CD-ROM version, you may find yourself moving from BookManager, to the UICL reference, to an EPM session with sample tutorial code. While extremely valuable for searches, on-line documentation cannot replace a few well-placed sticky notes or fingers for flipping between multiple sources. Overall, I find CD-ROM documentation a poor substitute for printed manuals, but a very useful adjunct.

Despite the steep learning curve, once you get the feel for the UICL, you'll never want to turn back. One line of code can replace scores of standard C library calls. With fewer than a dozen lines, you can write a functional GUI application: three lines to setup the windows, two to display text, and a few lines of additional overhead. Menus, file dialogs, containers, and similar features require little additional effort. If you tire of endlessly specifying default values (such as window attributes, file open parameters, etc.), the UICL brings welcome relief.

The Debugger

When I first tried the IPMD, I thought it was the most bizarre looking (and behaving) debugger I had yet laid eyes on (see figure on p. 43). The source window includes a line of buttons with cryptic icons that still leave my head spinning when I try to figure out how to open a particular window (such as the stack). Fortunately, here, as with every functional aspect of the debugger, IBM provides a plethora of button alternatives—menu selections, shortcut keys, and mouse actions on the window.

Consider the options available for viewing variables. Your choices include:

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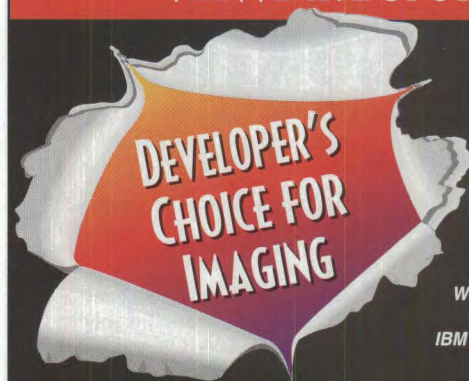
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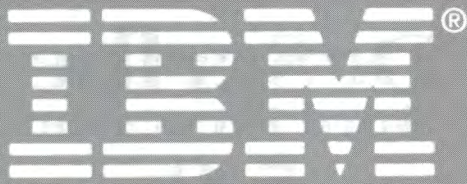
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able's representation (from decimal to hexadecimal and back), expand a pointer to display the associated data, display the variable's context, or change the value. One thing I *wish* I could do is display the variable's address or, better yet, load a memory watch window for the address range starting with the variable's address. Instead, you must manually find the address through the debugger menus (by setting a watch expression with the address operator prefix; e.g., type `&a` for the address of variable `a`), then open a memory window and enter the address.

IPMD includes the full complement of debugging tools you would expect: breakpoints, individual thread tracing, source code and assembler views, watch variables, memory windows, stack viewers, and register values. What makes IPMD helpful is that each function occupies its own window on the desktop. You can move, close, and overlap windows in whatever fashion best suits your needs.

A Case for KASE

IBM also has integrated the other tools PM programmers have come to expect such as resource editors (for icons, dialogs, and fonts), make utilities, linkers, and library managers. The most significant new member, KASE:Set, brings entry level visual programming to the C Set environment.

As a subset of the full KASE:VIP package (marketed separately by KASEWORKS), KASE:Set leaves you hungry for just a little more power. For example, if you incorporate dialogs (one of the central PM design elements) into the KASE:Set applications, you will quickly discover that KASE:Set does not provide tools for linking application code to dialog objects (a feature unique to the full VIP version).

Nevertheless, KASE:Set will save time developing such fundamental design elements as menus and notebooks (along with associated user-defined code) should you choose to automate the process. KASE:Set takes your graphical design and generates either C or C++ code, at your discretion. You then have a choice. You can tweak the code, within limits, for reimport into KASE:Set and further refinements. Or you can use the KASE:Set generated code as a starting point for hand-generated code.

As it stands, KASE:Set strikes me as a very useful tool for generating C code. PM programming can be a monotonous chore, and KASE:Set reduces the drudgery. With C++, however, the class libraries streamline the chore sufficiently that I am tempted to forego the KASE:Set tools.

To some extent, the choice is a matter of style. If you generate code through KASE:Set, you are stuck with the programming conventions inherent to the visual tool. You may be more willing to accept the trade-offs in a larger, C-based project. For a more thorough overview of the process, see Todd Crowe's review of KASE:VIP in the July 1993 issue of *OS/2 Professional*.

CSet ++ with KASE:Set does not provide a visual development platform on par with more fully integrated tools such as Digitalk Parts, the full KASE:VIP package, or even CA-Realizer. KASE:Set aside, C Set ++ is a top-notch development package for the serious C or C++ programmer. If you require a visual development platform you can add KASE:VIP to the package (if you're unsure, give KASE:Set a try—it will at least give you a taste for the full version).

Although the learning curve is steep, C Set ++ provides a set

of first-class development tools that blend almost seamlessly into the OS/2 environment. If IBM could just help bring the OS/2 applications up to the standards set by the development tools, we could all better appreciate the features of the Workplace Shell. ♦

AT A GLANCE

IBM C Set ++ 2.1

IBM Corporation
(800) 342-6672

IBM C Set++ 2.1 is sold in a Bonus Bundle that contains C Set ++ CD-ROM, OS/2 for Windows, KASE:Set and Experience C++ for \$249. With hard copy documentation, the CD-ROM is \$279, 3.5 inch disks with hard-copy documentation are available for \$309.

BocaSoft WipeOut for OS/2

This 32-bit screen saver is OS/2 at its best.

BY MARLENE SEMPLE

BocaSoft WipeOut is a delight. It's a 32-bit animated screen saver with audio and movie capabilities that cleverly shows off OS/2. This is the sort of programming that users deserve in OS/2 software.

WipeOut impresses right away with the graphical, animated installation program that shows file icons moving from the diskette drive to the hard disk. After installation completes, you simply double click the BocaSoft WipeOut icon on the OS/2 desktop to set up your screen saver display.

WipeOut features a list of 16+ screen saver choices and a window that displays a sample of the currently highlighted option. If you want to see a full running version of a screen, just select it and push the Test button. For example, if you choose Bugged, roaches crawl up the screen at the pace of your choice.

If you have installed MMPM/2 (included with OS/2 2.1)

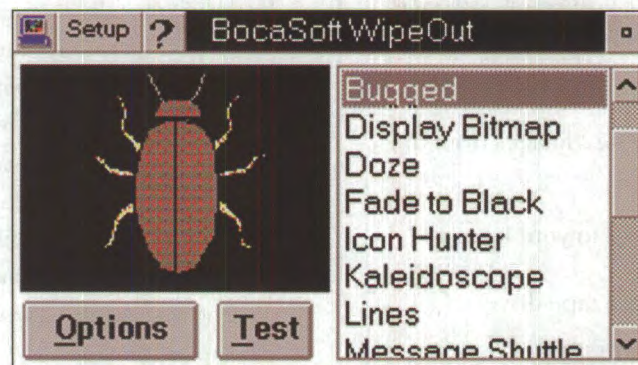
along with a supported audio card, you will hear the accompanying background music. Likewise, you can play full motion Ultimotion Video Movies in WipeOut by installing Ultimotion Video Support from MMPM/2.

The video support is one of the "plus" screens. In addition to the 16 base screens, you can select a video clip, a random base

screen, or an After Dark entry. The latter feature is new to version 1.2. If the string of OS/2 code names (Borg, Ferengi, Warp) has left you wanting more, WipeOut can call the WipeOut After Dark Server to run the ever-popular Star Trek: The Screen Saver or After Dark classics such as Flying Toasters. However, you must

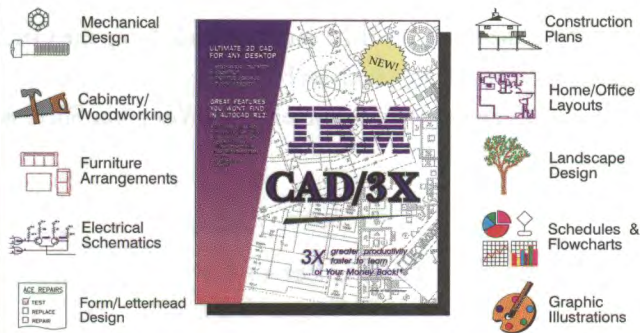
install one of Berkeley Systems' programs to use this feature.

As you would expect, you can customize features such as start-up parameters, password, and audio through the Setup button. An



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additional Options button changes settings for individual displays.

A developer's toolkit is included on the WipeOut diskette. It includes source code for a working sample program that you can use as a template. If you develop your own animated, video-enabled display, BocaSoft says it might buy it from you and include it in the next version of WipeOut. ♦

AT A GLANCE

WipeOut

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Debugging Softly

Error Manager earns its keep by saving you time and aggravation when you need to debug an OS/2 C or C++ program.

BY BRADLEY D. KIEWER

Have you grown tired of cross-referencing Control Program error codes in the reference manuals? If you write C programs using the OS2.H header file and make many calls to the Dos..() functions, chances are you answered "Yes." In that case, Soft & GUI Inc.'s Error Manager can save you both time and aggravation the next time you debug an OS/2 C or C++ program.

Error Manager's primary element is a DLL (and its associated LIB and header files for compilation) that redirects error code information to a file. In addition to the numeric code, Error Manager reports a brief description of the error, thus ending your search through the Control Program Library's documentation.

Adding the reporting features couldn't get much easier. Simply add one include statement (`#include <errormgr.h>`) and link the error manager library (`errormgr.lib`) into your program. You tell error manager where to send the output by setting the ERRORLOG environment variable.

DOT EXE

Typically, you would set the ERRORLOG to a file. However, the Error Manager package includes a named pipe reader (see this month's *Code Cache* for details about named pipes) that displays Error Manager output in real time. Simply set the ERRORLOG environment variable to \PIPE\VIEWER.

Publicly defined function calls within the Error Manager libraries give you some additional control over output. You can add your own messages to the log (for example, add information about the current program state), tell Error Manager to skip error reports for a certain section, or display errors to a pop-up menu defined through the program itself.

While testing, Error Manager generated a few informational and warning messages during the compile stage. The messages did not appear in the Error Manager documentation, so I called Soft & GUI technical support (while waiting for the return call later that day, I continued testing). Despite the warnings, my application worked as expected and Error Manager dutifully reported the run-time errors it encountered.

As it turns out, the warning messages appeared because I had made calls to 16-bit APIs that Error Manager could not map to its 32-bit equivalents (the test application in question was a text-mode program). I was told that I could remove the 16-bit calls from my program, remove the corresponding prototypes from the Error Manager header files, or simply ignore the warnings (I chose this last option).

The informational error was the result of an IBM change in the C Set ++ compiler. Again, Tech Support confirmed that I could either ignore the message or change the header files to adapt the old checkout pragma to the newer info pragma (which functions similarly).

Despite the documentation's shortcomings, Error Manager is a useful adjunct to the OS/2 developer's toolkit. And unlike some development tools that can take hours of practice to use effectively, Error Manager should begin earning its keep almost immediately. ♦

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Error Manager 2.0

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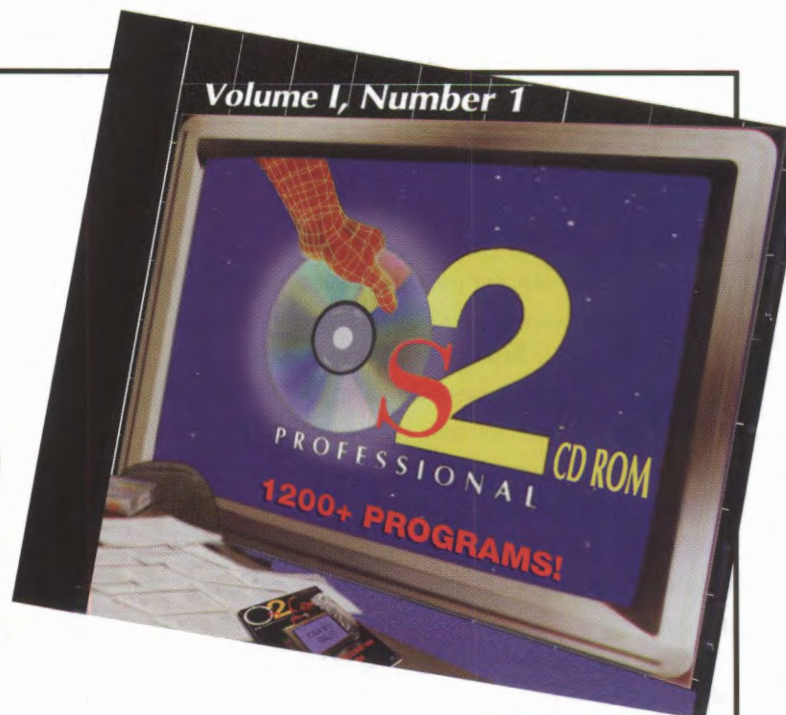
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THE CHALLENGE OF NETWORKED CD-ROM DRIVES

Although it may not be easy to use a CD-ROM on a network with an OS/2 client, options are available to simplify the process.

BY WAYNE RASH JR.

Using a CD-ROM drive with OS/2 has never been much of a problem. As long as the drive is attached to a controller that OS/2 recognizes, usually a SCSI controller, it works fine. In fact, it works a lot better under OS/2 than under some other operating systems. With MS-DOS, for example, the operating system needs a collection of special drivers for DOS to recognize the existence of the CD-ROM and to be able to access it.

In the networking arena, however, things are a little different.

The problem with networking is that most network operating systems start out assuming that they're going to be running with client computers in a DOS environment. This means that they're often shipped with special driver software that interacts with modified CD-ROM drivers on the clients. This works fine under DOS, but OS/2 doesn't have those drivers available, and as a result, it's sometimes not as easy to use a CD-ROM on the network with an OS/2 client as it is with an MS-DOS or Windows client.

Fortunately, there are solutions. IBM's LAN Server product, which is based on OS/2, supports CD-ROM drives as a part of the network just as it supports any other drive for use under OS/2. The only disadvantage to using LAN Server has been the fact that fewer than ten percent of all LAN installations use LAN Server. This has left the rest of the world looking for an answer in a world designed for DOS users.

Here, too, there have been answers. As long as the package you want to use with the networked CD-ROM runs under DOS, all you have to do is load the MSCDEX emulator along with the required CD-ROM drivers under OS/2. Unfortunately, this doesn't work if you're trying to use an OS/2 application with a CD-ROM. In addition, there are a number of considerations that play a role in selecting the proper CD-ROM drive for any networking application, including one that uses OS/2.

Getting Access

The greatest source of problems for networked CD-ROM access

has been with Novell NetWare. Because NetWare commands something like two-thirds of the network operating system market, nearly all third party products are aimed at the NetWare environment. Most of these also assume that the client workstations on a NetWare LAN will be running DOS or Windows. If you're running a client that's not, you may find that a number of network services, including CD-ROM access, are more difficult to arrange.

Fortunately, Novell has been under pressure from its users to support CD-ROMs as NetWare volumes. Partly, this has been because NetWare version 4 is distributed on CD-ROM, giving administrators a reason to buy a CD-ROM drive for their file servers. Naturally enough, once the drive is installed, most LAN operators want to make it available to the network. With its customers demanding CD-ROM support, Novell finally delivered.

The first version of CD-ROM support delivered by Novell, called CDROM.NLM, worked but wasn't particularly flexible. This version, which is still part of most installations of NetWare versions 3.12 and 4.01, would support only single CD-ROM drives. In addition, the disks each needed to have a unique disk label and be in the ISO-9660 format. This is the most common CD-ROM disk format, but the less common High Sierra format is still widely used. In addition, the Novell software wouldn't support CD changers or jukeboxes.

Help From Big Red

User requests for more flexible support spurred Novell to update its software, so that the product now supports some CD-ROM changers and jukeboxes. In addition, the disks don't have to have a unique label, solving a problem for users who wanted to load multiple versions of the same CD on their servers.

A more important change has been with performance. With the old version of Novell's software, mounting a CD-ROM as a NetWare volume could take several minutes as the network oper-

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Circle #238

CONNECTIVITY

ating system created the necessary disk caches and databases on the file server. This process now has been speeded up, although there remains a brief delay when NetWare mounts a CD volume.

For a CD-ROM drive to work on a NetWare file server, it must use an ASPI-compatible SCSI controller and a CD-ROM drive with a SCSI interface. ASPI (Advanced SCSI Programming Interface) is an industry standard software interface supported by most manufacturers of SCSI host adapters. It is supported by most operating systems as well, so these adapters can be used on most computers.

The ASPI driver software is usually included in the package with the host adapter, or is available on request or on-line from the company. Getting the NetWare software to work also requires a set of drivers included with NetWare.

Getting the Right Stuff

Then there's the challenge of getting the right hardware. Even though nearly any SCSI CD-ROM drive will work with NetWare or with LAN Server, that doesn't mean it's necessarily a good idea to use just any drive. More importantly, the CD drive and the SCSI host adapter must both be selected with network access in mind if performance is going to be adequate.

According to David M. Cole, director of research and development for Chinon America, Inc., in Los Angeles, having enough cache on the disk subsystem is critical. Chinon makes CD drives that are frequently used in networking environments.

Cole notes that caching is more important for OS/2 and NetWare than it is for systems running DOS or Windows, neither of which supports multithreading. "The single most important aspect [of the operating system] is that it's multithreaded," Cole says; that aspect of OS design is more memory intensive. He also said that it helps performance if both the CD drive and the SCSI controller have enough cache. Cole recommends that the CD drive have at least 256kb of cache of its own so that it can handle multiple requests simultaneously.

Cole suggests that a minimum configuration for a networked CD-ROM subsystem would include a SCSI host adapter meeting Fast SCSI-2 standards, along with a SCSI-2 CD drive. He recommends that the controller have enough built-in cache to handle the CD-ROM drive as well as any other SCSI devices that may be installed, including the server's hard disk. In addition, he thinks that going for the high end is a good idea. "There are definite advantages for high-bandwidth controllers, including Fast SCSI and Wide SCSI," Cole says.

CONNECTIVITY

Once you've decided on the hardware, you then have to decide if you really want to use your file server as the location for CD-ROMs. Using the file server can be very cost effective, since there's probably already an acceptable CD-ROM drive installed there. But it may not be the best solution, for two reasons. The first is that CD-ROM access can tie up server resources you may not want used. The second is that network users may need more than a single drive, and they may need to have physical access to the drive.

Novell NetWare, for example, requires considerable memory and disk space for a CD-ROM that's attached to the file server. While the specifics vary according to the CD-ROM, such use frequently means that more memory will have to be added to a file server before it can be used. Both NetWare and LAN Server can suffer from some performance problems if on-board CD-ROMs are accessed heavily.

On a Workstation?

Fortunately, there are ways to move the CD-ROM access away from the network file server while keeping the CD-ROM on the network. One of the easiest for OS/2 clients is CD-View from Ornetix Technologies, Ltd., in Sunnyvale, California (408/744-9095). CD-View emulates NetWare on a workstation, allowing other clients on the network to have access to a workstation's resources, including its CD-ROM drive, as if it were a NetWare file server. The difference is that the product runs as a TSR (terminate and stay resident) program in DOS or in the OS/2 DOS shell, and it does not require any special hardware. In fact, it will work with any CD-ROM drive supported by DOS, which is essentially all of them.

Ornetix President Elias Shahvar says that the product is completely transparent to OS/2, so any user with the OS/2 NetWare Requester can use CD-View just as he or she would use any NetWare file server. In addition, because CD-View isn't running on a NetWare file server, the users don't need to have access to the NetWare server to use the CD-ROM. While NetWare tools and utilities are still needed for the administration of CD-View, the users can continue to access the CD-ROM drive even if the NetWare file server is turned off.

In addition, because the Ornetix product can be used from just about any DOS workstation, the CD-ROM drives are near the users, so they can change disks when they need to, freeing up the network support staff from requests to locate and mount specific CDs. CD-View pricing starts at \$595 for up to 10 concurrent users.



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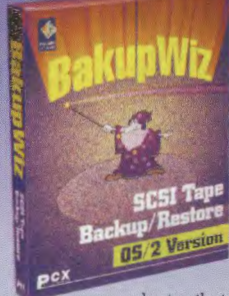
CONNECTIVITY

Of course, the fact that a CD drive is actually located on a workstation doesn't change the fact that it will be made available to a number of users, so where possible, the requirement for caching and for a high-performance disk subsystem for the CD drive is still important.

Now that there are products available that will give OS/2 users access to CD-ROMs on their networks, the array of commercial data and multimedia material that's available only on CD-ROM can be added to a company's arsenal. More importantly, network access to CD-ROMs can save a great deal of money, both because only a few CD drives must be installed, and because network licenses to the material on CD-ROM are typically much less expensive than the cost to outfit each individual with a copy of a CD-ROM.

And of course, much commercial software is now being distributed on CD-ROM. Likewise, there's a wealth of CD-based material in the public domain or available as shareware (including on the *OS/2 Professional CD-ROM*). To run a network without CD-ROM access these days means to miss entire segments of the marketplace. ♦

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MARKETLINE

Product News for the OS/2 User

SCOOPS

Pro Engineering Rolls out RAID for the Desktop

In the wake of the successful launch of EZRAID for OS/2 in March, Ontario-based Pro Engineering began work on a smaller version of its disk management software designed for individual desktop users. After a remarkably short development cycle, EZRAID Lite for OS/2 began shipping last month.

The software package provides support for two drives, allowing a user to stripe or span data to create a single logical drive. It also allows the mirroring of existing logical drives, enabling real-time backups.

EZRAID Lite features support for IDE and ESDI as well as SCSI disk drive inter-

faces. "It's really geared toward the non-server market," says Robert Lendvai, v.p. of marketing and sales for the company, who explains that Pro Engineering brought the scaled-down version to market in direct "response to the success of OS/2 on the desktop."

With this new product, Pro

Engineering is targeting the individual OS/2 power user. The company's earlier RAID product, by contrast, is geared toward the corporate user running OS/2 on a server. EZRAID Lite for OS/2 is priced at just under \$200, a figure that Lendvai says "puts it into the commodity price level."

New Products

New database library

Objects++ Software Corporation hopes to broaden the scope of C/C++ database development with the release of SQL Object++ C/C++ Database Library 2.0. The product is a database access library designed to give developers a common way to access a number of SQL and non-SQL databases, and features support for ODBC, IDAPI, and C.O.D.E. Direct database driver access is also supported. This latest version incorporates support for SQL Base, Watcom SQL, and ASCII files, while maintaining support for Oracle, Sybase, SQL Server, DB2/2, NetWare SQL, and Btrieve. Versions are available for OS/2, NT, Windows, and Unix. All database drivers ship

with the product, and prices range from \$695 to \$4,995. Source code options are also available. Objects++ Software Corporation, 47 Stonewall Street, Cartersville, GA 30120. (404) 382-6585, fax (404) 382-6374.

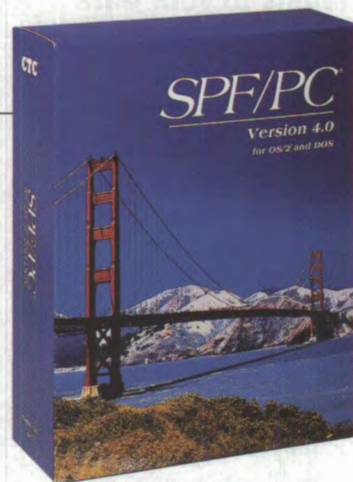
A resourceful utility

On Demand Software & Services Inc. last month began shipping Pegasus Resource Monitor for OS/2, a utility previously available in a shareware version. Pegasus is a real time Presentation Manager tool for monitoring system and application resource usage. It features a configurable sample rate, performance settings and alarms, thread detail display, and data logging capability. The product supports OS/2 2.x,

includes REXX extensions, and comes bundled with the Pegasus Tools Package. Pegasus Resource Monitor 2.0 is currently being sold for \$99. On Demand Software & Services Inc., 1100 Fifth Avenue South, Suite 208, Naples, FL 33940. (800) OS2-OS29, fax (813) 261-6549.

CTC's mainframe editor upgraded

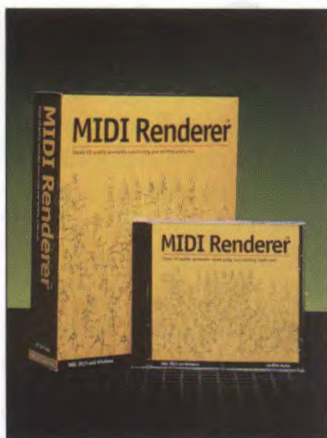
Command Technology Corporation is shipping SPF/PC version 4.0, an upgrade to its file manager and full screen text editor. SPF/PC emulates IBM's ISPF/PDF, providing a familiar environment for mainframe programmers faced with the challenge of developing on a PC. SFP/PC 4.0 is an upgrade to all previous versions of SPF/PC and



SPF/2 that includes modifiable panels, table services, an Undo/Redo function, full mouse support, and scrollable input fields. The product is supplied in DOS and native OS/2 versions. It lists for \$295; through the end of this month, it is available for \$199. Upgrades cost \$59 through Aug. 31; thereafter, they will be priced at \$69-\$99. A LAN version is also available for 10+-license sites. Command

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Technology Corporation,
1040 Marina Village Parkway,
Alameda, CA 94501. (800)
336-3320, fax (510) 521-
0369.



Music to your ears

DiAcoustics has released MIDI Renderer, a software synthesizer that provides an alternative to a sound card's on-board synthesis. The product is capable of producing CD-quality digital audio files from standard MIDI files using existing sound cards. It ships with a 200mb collection of General MIDI instrumental samples. Supported MIDI commands include dynamic voice allocation, pitch blend, and aftertouch control. Minimum operating system requirements: OS/2 2.0, Windows 3.0, or DOS 3.1. MIDI Renderer is available for \$69.95 through the end of August, and \$129.95 thereafter. DiAcoustics, 555 Sparkman Drive, Suite 600-F, Huntsville, AL 35816. Phone/fax (205) 722-0490.

A diverse landscape

IBM is currently shipping a

new software bundle called Advanced Server for Work-Groups. The package contains software from both IBM and Lotus Development Corp. On the IBM side, the package includes OS/2 2.11, LAN Server Advanced 3.0, and System Performance Monitor/2 2.0. From Lotus, the bundle features Lotus Notes 3.0 mail and messaging capabilities, a development environment for distributed applications, and discussion and collaboration databases.

LAN Server Advanced 3.0 provides resource management across the network with fault tolerance and security features. The collection ships on CD-ROM and contains a manual and videotaped installation instructions. The price includes 90 days of IBM customer support as well as a U.S. promotional offer for discounts on IBM consulting services for application design, implementation, and customization of Lotus Notes applications. The product is available from IBM Direct at

a list price of \$4,695, and through retail channels. Call IBM Direct at (800) 426-2255, fax (800) 242-6329.

A quick study

AutoTester Inc., last month began shipping AutoTester 2.0, an OS/2 PM testing and verification tool geared toward business analysts and developers. The tool's primary focus is the new AutoCommand feature, which records and documents testing procedures for future use. AutoTester also features LearnWindow, a function that "learns" a window and all controls contained within it. Other features include a toolbar for quick access, dynamic window placement and positioning, advanced control querying and manipulation, and automatic synchronization for testing host-based applications through terminal emulator packages. Cost: \$5,000 for the first copy, with discounts available for two or more copies. AutoTester Inc., 8150 N. Central Expressway, Suite

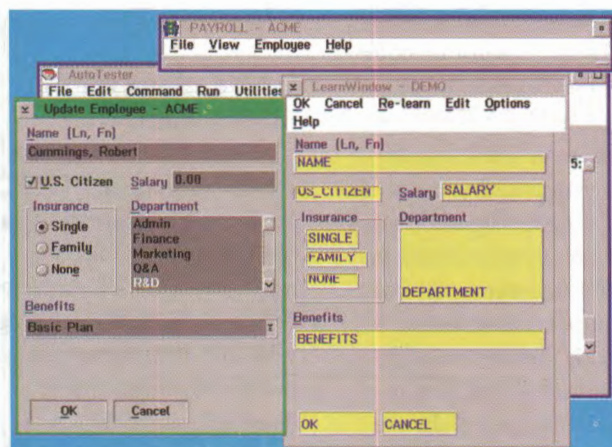
1300, Dallas, TX 75206. (800) 328-1196, fax (214) 750-9668.

Enabling software

IBM is releasing Screen Magnifier/2, a software product that enables visually impaired users to interact more easily with their PCs. The product, the most recent addition to IBM's Independence Series for the disabled, enlarges applications running under OS/2 2.1 or later. With this application, users are also able to magnify any DOS or Windows application. Magnification levels range from 2-32 times normal size. Features include a "reading mode" that pans the cursor along the lines of magnified text, controllable reading speeds, color contrast adjustment capability, and a locator for identifying where the magnified window is on the system. The product sells for \$495. For more information, call (800) 426-4832; to order, call (800) 426-3388.

OS/2 training by computer

Individual Software Inc. has released Training for OS/2 2.1, menu-driven software that guides new users through the basics of working with OS/2. The computer-based training covers objects, desktops, windows, folders, printing, and general administration. The program also features the Advanced Techniques session for the more experienced user who requires instruction in areas such as the System Editor or



The LearnWindow feature in AutoTester for OS/2 2.0 automatically "learns" all of the controls contained in a window.

MARKETLINE

object template construction. The application is indexed, allowing users to search for a particular subject for on-demand training. Single-user programs cost \$69.95, and network licenses are \$499.95. Site licenses will be available. Individual Software Inc., 5870 Stoneridge Drive, #1, Pleasanton, CA 94588. (800)

822-3522, fax (510) 734-8337.

Note(s) this

Massachusetts-based Percussion Software, Inc. has released two Lotus Notes add-ons, Notrix and Notrix Composer version 1 for EDA/SQL. Both enable users to move data between enter-

prise databases and Notes without any programming, and are designed to help customers manipulate and view large Notes databases and to build workflow applications. Both also include an "active agent" that lets users trigger events in Notes and external applications in response to activity in a document, docu-

ment field, or database. Notrix is priced at \$3,495, and Notrix Composer lists for \$4,995. Both run on OS/2-based servers and work with any Notes-supported client. Percussion Software, Inc., 222 Berkeley St., Suite 1620, Boston, MA 02116. (617) 267-6700, fax (617) 266-2810.

News

OS/2 Vendor Council restructures

In a move described as a "formalization of the internal organization" of the OS/2 Vendor Council, Tony Pereira has relinquished direction of the vendor group to Binar Graphics President Scott Vouri and a new set of officers. The changes began to take shape during the PSP Interchange in San Francisco and were finalized during a mid-May council meeting in Dallas.

The council was formed in January to gain a foothold for OS/2 products in major retail channels nationwide, a goal that Pereira says has been met. "When we began, we wanted to get our products into nine outlets and to date, we have done just that."

Yet Pereira admits that in hindsight, the process was anything but smooth. For example, "The advertising campaign was an accounting nightmare," he says. It quickly became clear that more structure and attention were needed—demands that Pereira, the

president of Clear & Simple, could not meet while also ramping up for a new product release.

The Vendor Council now has a governing structure, committees with specific responsibilities have been formed, bylaws are being drafted and, for the first time, a council bank account has been established. "Our mandate is to grow the marketplace for OS/2 and related products," says new President and spokesman Scott Vouri of Binar Graphics. "We're preparing a major campaign geared toward the fall release of Warp," an event that many in the industry believe will generate substantial new interest in OS/2.

IBM honors OS/2 developers

Responding to complaints that it has not been working to retain its top developers, IBM used its annual Corporate Technical Recognition Event to honor the contributions of a number of key OS/2 develop-

ers. At the awards ceremony, held June 1 in Orlando, Florida, CEO Lou Gerstner presided as IBM Corporate Awards totaling more than a half-million dollars were awarded to PSP staffers from Boca Raton, Austin, and the Santa Teresa lab in San Jose. Among those recognized were the designers of the OS/2 Integrating Platform, SOM, OS/2's video display software integration, the Workplace Shell, the overall System Architecture, and the implementation of OS/2 for Windows. And while no official transcripts were available, Gerstner reportedly took the opportunity to deliver a pep talk to the 300 or so in attendance.

Musical nameplates at PSP

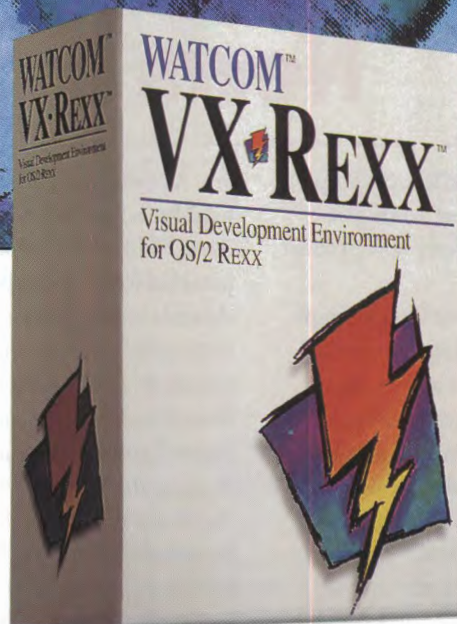
IBM's PSP division has done it again. In a move that the company says will place greater emphasis on the development of its Workplace technology, IBM in June announced internally a major redeployment of personnel.

All but one of the executives affected by the reorganization are native IBMers. David Schleicher, former v.p. of development for the AS/400 division in Rochester, Minnesota, has moved to Austin to assume the title of assistant general manager for workplace development. Former VP of Sales and Marketing Dan Lautenbach has assumed greater responsibility as director of worldwide marketing of personal operating systems. Both are strategic positions reporting directly to PSP President Lee Reiswig. Also involved in the shift is a team of four who now report to Lautenbach: Peter Hayes has become director of marketing communications; Lois Dimpfel is now division director of personal operating systems; Dave Harrington is director of software development; and JoAnn Sager, who came from Boston-based Miller Communications, has assumed Hayes' former title of director of communications. ♦

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PC Magazine, February 8, 1994.

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Software Development, November, 1993.

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- ▶ Integrated console window support simplifies migration of existing REXX programs



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OS/2 Inter-Process Communication Pipes

BY CAREY GREGORY

OS/2 supplies a rich set of inter-process communication (IPC) services within the base API. In April we examined OS/2 queues, which provide a flexible and robust inter-process data communication mechanism. The May installment covered semaphores, which provide signaling, synchronization, and access control services between processes. With these two subsystems, nearly any application's IPC requirements can be met without resorting to shared memory or file-based solutions.

However, queues and semaphores alone leave two fundamental requirements missing from the IPC toolbox.

First, IPC communications should permit control over the input and output of any program—not just those specifically written to some pre-defined IPC interface. An example is the redirection of output from one program into the input of another (as in the **more** command). OS/2, like Unix, provides this capability with unnamed (anonymous) pipes. Anonymous pipes allow related processes on a single machine to communicate directly with each other.

Second, the communication mechanism should allow a process running on one machine to communicate with a process running on another machine. All of the IPC mechanisms discussed so far work only between processes on a single machine. While most of OS/2 is inherently network aware, the queue, semaphore, and anonymous pipe APIs are designed for local use only. Although the OS/2 file system includes transparent networking functions, a file system interface is often an inefficient and limited form of IPC. To improve such communications, OS/2 provides a named pipe interface that works across networks.

Anonymous Pipes

The single function dedicated to anonymous pipe implementation reflects the simplicity of this mechanism. Anonymous pipes work only between related processes on a single machine. **DosCreatePipe()** creates an anonymous pipe and returns read and write handles for the pipe. The only option you may specify is the pipe size, and that is purely an advisory number—the actual size depends on the amount of memory available. The following code fragment creates an anonymous pipe:

LISTING 1

PARENT.CPP

```
#define INCL_DOS
#define INCL_DOSERRORS

#include <os2.h>
#include <stdio.h>
#include <string.h>

int main(int argc, char **argv)
{
    HPIPE      hRead1, hRead2, hWrite1, hWrite2;
    char       Buffer[256],
              FailName[CCHMAXPATH];

    RESULTCODES Results;
    ULONG      ReadLen, WriteLen;
    HFILE      hStdIn, hStdOut;
    HFILE      hChildStdIn, hChildStdOut;

    // save copies of stdin and stdout

    hStdOut = hStdIn = 0xffffffff;
    DosDupHandle(0, &hStdIn);
    DosDupHandle(1, &hStdOut);

    // create two unnamed pipes

    DosCreatePipe(&hRead1, &hWrite1, 0);
    DosCreatePipe(&hRead2, &hWrite2, 0);

    // redirect stdin and stdout to the pipes

    hChildStdIn = 0;
    hChildStdOut = 1;
    DosDupHandle(hRead1, &hChildStdIn);
    DosDupHandle(hWrite2, &hChildStdOut);

    // start the child program - it will inherit
    // our stdin/stdout which is currently
    // the two pipes created above

    DosExecPgm(FailName, sizeof(FailName),
```


CODE CACHE

```
EXEC_ASYNC, NULL, NULL,
&Results, "child.exe");

// restore our stdin/stdout - this
// does not affect the child

DosDupHandle(hStdIn, &hChildStdIn);
DosDupHandle(hStdOut, &hChildStdOut);

// write to the pipe - the child process
// will receive this as input on stdin

DosWrite(hWrite1, "hello",
        strlen("hello"), &WriteLen);

// read the pipe - this will be whatever
// the child writes to stdout

DosRead(hRead2, Buffer,
        sizeof(Buffer), &ReadLen);

// echo it to stdout

DosWrite(1, Buffer, ReadLen, &WriteLen);

return (0);
}
```

LISTING 2

CHILD.CPP

```
#define INCL_DOS
#define INCL_DOSERRORS

#include <os2.h>
#include <stdio.h>
#include <string.h>

int main(int argc, char **argv)
{
    ULONG        ReadLen,
                 WriteLen;
    char        Buffer[256];

    // read stdin and concatenate a string
    // to the input

    DosRead(0, Buffer, sizeof(Buffer)-
            strlen(", world."), &ReadLen);
    Buffer[ReadLen] = '\0';
```

```
HPIPE    hRead;
HPIPE    hWrite;
DosCreatePipe(&hRead, // read handle
             &hWrite, // write handle
             0);      // use default pipe size
                pipe size // (512 bytes)
```

After a process creates a pipe, any process spawned with **DosExecPgm()** will, by default, inherit the pipe handles. The child process may then read from and write to the pipe using the **DosRead()** and **DosWrite()** functions. Note, however, that it must be made aware of the handle values via shared memory, the command line, or some other mechanism.

More commonly, programs use anonymous pipes to redirect the I/O of a child process transparently. With this approach the child process need neither cooperate with the parent nor know that its I/O occurs through pipes. The technique relies on the fact that any program can redirect its own **stdin** and **stdout** handles using **DosDupHandle()** and then spawn a child program that will inherit the parent's **stdin** and **stdout**. The small sample program in Listing 1 demonstrates the technique.

This program spawns the program shown in Listing 2 after redirecting its own **stdin** and **stdout** to the two pipes it created. Since the child program will inherit the parent program's open file handles, its input and output will be connected to the pipe owned by the parent program instead of the screen and keyboard (as is usually the case). Notice that after spawning the child program, the parent program restores **stdin** and **stdout** to their original files so that it can write to the screen.

Because the child program receives a *copy* of the parent's environment, changes the parent makes after spawning the child have no effect on the child. The truly interesting feature of the program in Listing 2 is that the child program remains completely unaware that its input and output are connected to a pipe. In fact, the parent program in Listing 1 could spawn any program and achieve the same results. This transparent file redirection feature is unique to anonymous pipes. All other IPC mechanisms, including named pipes, require explicit cooperation on both sides of the client/server equation.

Named Pipes

A named pipe enables two processes to communicate directly with each other even when the processes reside on different machines. Furthermore, regardless of process location (local or network), they need not be related. Unlike the simple, single-function anonymous pipes, named pipes are powerful, quite

CODE CACHE

flexible, and may use a rather complex combination of function calls.

Our remaining examples will focus on a simple named pipe. The server (the process that creates the pipe) appears in Listing 3, and the client (which uses an existing pipe) appears in Listing 4. These programs represent the simplest possible named pipe client/server design. The server opens a single pipe, writes text to it, and closes it. The client simply opens the pipe, reads text from it, and prints the text. A more sophisticated example will appear in the next *Code Cache*, where we can devote more attention to its complexity.

A process becomes a server by creating a named pipe with **DosCreateNPipe()**, thus establishing one end of the pipe. Any process that knows the pipe name can connect to the other end of the pipe using **DosOpen()** and thereby becomes a client. A named pipe has an input buffer and an output buffer with sizes specified by the server. Unlike anonymous pipes, which always return separate read and write handles, named pipes use a single handle for all operations on the pipe. The server receives its handle when it creates the pipe with **DosCreateNPipe()**, and the client receives its handle when it opens the pipe using **DosOpen()**.

The server program specifies the name and characteristics of a pipe upon creation, and controls all client access to the pipe with the **DosConnectNPipe()** function. Additionally, if the server must forcibly disconnect a client, it can do so through the **DosDisconnectNPipe()**. Forcibly disconnect with caution, however, as the system may lose data currently in the pipe. The preferred disconnection method is for the *client* to call **DosClose()**, ensuring data integrity.

Pipe names take the form **\\pipe\\PipeName** for local pipes, and **\\ServerName\\pipe\\PipeName** for pipes on remote machines. A client process can open a pipe on any machine, but a server process can create pipes on the local machine only. When the server process creates a pipe it specifies the direction that data will travel on the pipe. Inbound pipes allow clients to write to the server, outbound pipes allow the server to write to clients, and duplex pipes allow data flow in both directions.

The server program also specifies whether the pipe will be in message mode or byte mode. Data passes through message mode pipes as a block of data that is written and read as a single unit. In byte mode a pipe behaves more like a file, allowing data to be read and written in arbitrary lengths. A server can override the mode setting and read a message pipe as a byte stream if it chooses; however, clients cannot override the mode, and servers cannot read a byte mode pipe in message mode.

```
strcat(Buffer, ", world.");

// echo the modified input

DosWrite(1, Buffer, strlen(Buffer), &WriteLen);

return (0);
}
```

LISTING 3

SERVER.CPP

```
#define INCL_DOS
#define INCL_DOSERRORS

#include <os2.h>
#include <stdio.h>
#include <string.h>

int main(int argc, char **argv)
{
    APIRET    rc;
    HPIPE     hPipe = 0;
    char      *PipeName = "\\pipe\\example.pipe";
    ULONG     Length;

    if (argc > 1)
        PipeName = argv[1];

    // create an outbound pipe - allow unlimited
    // instances even though this example
    // creates only one instance

    rc=DosCreateNPipe(PipeName, // pipe name
                     &hPipe,   // handle
                     NP_ACCESS_OUTBOUND,
                               // access mode
                     NP_UNLIMITED_INSTANCES,
                               // options
                     1024,     // out buffer size
                     0,         // no input buffer
                     0);        // default timeout
                               // (50ms)

    // put the pipe in listening state

    DosConnectNPipe(hPipe);

    // write some text to the client
```


CODE CACHE

```
DosWrite(hPipe, "hello", sizeof("hello"),
        &Length);
DosWrite(hPipe, "exit", sizeof("exit"),
        &Length);

// close the pipe

DosClose(hPipe);

return (0);
}
```

LISTING 4

CLIENT.CPP

```
#define INCL_DOS
#define INCL_DOSERRORS

#include <os2.h>
#include <stdio.h>
#include <string.h>
```

In byte mode, a process reads and writes to a pipe using **DosRead()** and **DosWrite()**. When working in message mode, **DosTransactNPipe()** reads a message, writes a message, or reads and writes using single call. Optionally, a message-mode process can open, read from, write to, and close a pipe with the **DosCallNPipe()** function—a particularly useful function for implementing infrequent or one-time requests.

However, if a significant number of messages will be exchanged between client and server **DosCallNPipe()** opens and closes the pipe with every call. In such situations, the repeated and relatively lengthy open and close transactions may adversely affect performance. In a high-transaction environment, you can improve efficiency by calling **DosOpen()**, **DosTransactNPipe()**, and **DosClose()** individually, and placing the open and close operations outside a block of multiple transactions.

In Listing 3 the fourth parameter to the **DosCreateNPipe()** function hints at an extremely powerful feature of named pipes, particularly in light of OS/2's multithreading capabilities. Although this example creates only a single instance of the pipe,

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CODE CACHE

it will allow multiple instances. Thus, we could extend the server's processing to handle multiple concurrent clients. Multiple instances of a named pipe are actually a set of separate pipes that share the same name.

The first call to **DosCreateNPipe()** specifies how many instances of the pipe may be created—the value may be fixed between 1 and 255, or left unlimited. Each subsequent call to **DosCreateNPipe()** using the same name creates a new instance of the pipe and returns a unique handle. Each client process that connects to a named pipe must connect to a separate instance of the pipe. If no instances of the pipe are available when the client attempts to connect, the client process will receive the **ERROR_PIPE_BUSY** return code. The client may then call **DosWaitNPipe()** to wait for the next available instance. An example of the connection logic for a client process is shown in Listing 4. This client handles both the situation in which the server has not yet created the pipe, and the situation in which the pipe exists but is currently in use by another client.

Each instance of a named pipe is in one of four states at any

```
int main(int argc, char **argv)
{
    APIRET    rc;
    int       i;
    HPIPE     hPipe = 0;
    char      *PipeName = "\\pipe\\example.pipe";
    char      Buffer[256];
    ULONG     Length;
    ULONG     Action;

    if (argc > 1)
        PipeName = argv[1];

    // wait up to 30 seconds for the pipe to
    // become available

    for (i = 0; !hPipe && i < 30; i++)
    {
        rc = DosOpen(PipeName,
                     &hPipe,
                     &Action,
                     0L,
```

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CODE CACHE

```
FILE_NORMAL,
OPEN_ACTION_OPEN_IF_EXISTS,
OPEN_ACCESS_READONLY |
OPEN_SHARE_DENYNONE,
0L);

if (rc)
{
    // if the pipe doesn't exist,
    // wait 1 second and try again
    // if the pipe is busy, wait up
    // to 30 seconds for a connection

    if(rc == ERROR_PATH_NOT_FOUND)
        DosSleep(1000);
    else if(rc == ERROR_PIPE_BUSY)
    {
        rc=DosWaitNPipe(PipeName, 30000);
        break;
    }
    else
        break;
}
```

given point in time. The states and their meanings are:

- **Connected.** The pipe has been created and connected by the server, and a client has opened the pipe. This is the only state in which data can be read from or written to the pipe.

- **Disconnected.** The pipe has been created but not yet connected by the server, or it has been explicitly disconnected by the server and not yet reconnected.

- **Closing.** The pipe has been closed by the client but has not yet been disconnected by the server.

- **Listening.** The pipe has been created and connected by the server, but has not yet been opened by a client. The pipe is ready to accept a **DosOpen()** request from a client. A **DosOpen()** call when the pipe is in any other state will result in a **ERROR_PIPE_BUSY** return code.

If a server program creates multiple instances of a pipe, there are two basic ways to manage them. The first is to serialize transactions by having a single thread handle all instances. This approach may be appropriate if concurrent activities are not desirable in the server.

Alternatively, the server may launch a separate thread to

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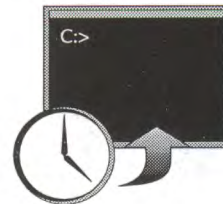
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CODE CACHE

manage each instance and thereby allow client requests to be processed concurrently. In OS/2's multithreading environment, this second approach better utilizes system resources.

If serialization of requests is the only reason for a single threaded approach, then a single instance of the pipe can be created. When using a single pipe (rather than multiple instances) the clients will spend more time waiting for a connection and less time waiting for the request to be fulfilled. Ultimately, however, the complete transaction cycle time should be the same.

Multithreaded vs. single-threaded server programs and multiple pipe instances vs. single pipe instances are important design issues when developing a named pipe server. In next month's *Code Cache*, we'll present a non-trivial example of a multithreaded, event-driven server that uses multiple pipe instances. ♦

Carey Gregory is the president of Gateway Technologies Corporation of Canton, Connecticut, a consulting and software development firm specializing in OS/2 and NT. He can be reached via the Internet at careyg@bix.com or on CompuServe at 71034,2205.

```
}  
}  
if (rc)  
{  
    printf("Unable to open pipe %s due to error  
        %u.\n", PipeName, rc);  
    return (rc);  
}  
  
// read the pipe as long as there's data -  
// stop if "exit" is received  
  
while (!DosRead(hPipe, Buffer,  
    sizeof(Buffer), &Length) && Length>0)  
{  
    puts(Buffer);  
    if (!strcmp(Buffer, "exit"))  
        break;  
}  
DosClose(hPipe);  
  
return (0);  
}
```

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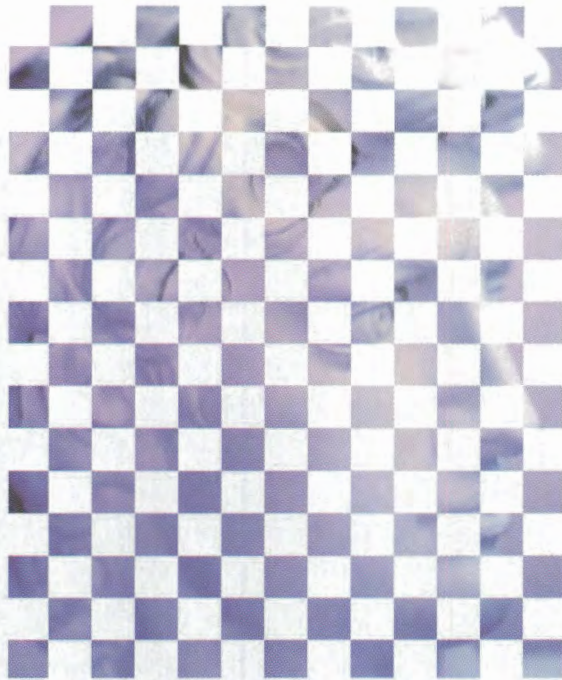
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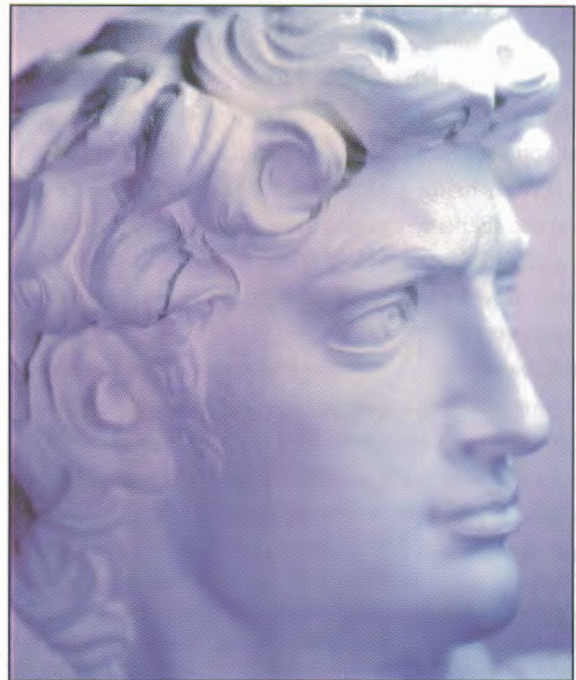
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Leaping Between OS/2 and DOS

BY GORDON SCOTT

If you had a choice, you'd rather jump off a bridge wearing a bungee cord than nothing at all. Likewise, if you have people who are considering OS/2 but fear that initial upgrade leap, you should show them two bungee-cord like features of the system, Dual Boot and Boot Manager. Like the reassuringly strong elastic cord, these features will assure that this big leap won't be their last.

With the Dual Boot feature, you tell your system to restart either DOS or OS/2 when running the other. That's important to someone who wants to learn about OS/2, but needs the assurance that a familiar environment is just a few keystrokes away. OS/2 enables Dual Boot automatically when you install OS/2 over a DOS system. Both operating systems reside on the same drive and share all FAT partitions in the system.

Boot Manager provides a simple point of entry for more sophisticated configurations. Whenever you start your machine, Boot Manager displays a menu of operating systems, allowing you to choose which one to run. Each bootable system uniquely owns one partition on the hard disk.

For example, suppose you want to test an application on several different platforms. You could set up a system with the operating systems installed and boot up to each system as you needed to test the application. Boot Manager will start any version of DOS, DOS/Windows, OS/2, NT, or AIX.

Boot Manager can be installed on a new or existing system. All you need is unpartitioned space available on your boot drive. If an unallocated space is

not available, you must delete and reformat an existing partition.

The following information will give you an idea of how to install the Boot Manager feature, and some ideas about making Dual Boot run smoothly.

Create a Boot Manager partition on your hard drive.

- If you need to delete a partition to create room for Boot Manager, back up the partition you plan to delete.
- Boot from the OS/2 installation diskette.
- Insert diskette 1 when prompted.
- When the "Welcome to OS/2" screen appears, press Enter to continue.
- When "Installation Drive Selection" appears, select option #2: **Specify a different drive or partition.**
- If the entire disk already has been formatted into partitions, delete the partition you backed-up and reallocate it as a smaller partition. (You must keep 1mb free for the Boot Manager partition.)
- Highlight the unpartitioned area on the disk where you want to add Boot Manager and then press Enter.
- Select **Install Boot Manager** to create the Boot Manager partition.
- Select **Create at Start of Free Space** if you are installing on an existing system or select **Create at End of Free Space** if you are installing on a newly formatted partition.
- From the Options Menu, select **Add to Boot Manager menu.**
- Enter a name for each operating sys-

tem you want available when booting up your system.

- **Restore backed-up data to any partitions you deleted and reallocated.**

The next time you boot the system, Boot Manager will present a character-based menu listing the operating systems you added to the menu. If you make no selection within the designated time period (the default is 30 seconds), Boot Manager will automatically start the default operating system.

Boot Manager is very useful when you need more than a simple switch from OS/2 to DOS, and back. It is your only option when adding an operating system to a machine that already has OS/2 installed.

While there are many different scenarios in which to utilize a Boot Manager configuration, three examples should serve as a starting point for your consideration.

First, if you are developing a cross platform application and want to test it in different native environments, you could install all the operating systems, plus Boot manager, on one machine. You'll then be able to choose the environment you want each time you start up the system for testing. If you keep the application in its own extended partition, it will be available to any operating system that can read the extended partition's file format (e.g. DOS, Windows, NT, and OS/2 could share a FAT extended partition).

Second, if you have multiple users sharing an OS/2-based system, you could let each of them choose the operating system he or she prefers. Or you could install different language versions of OS/2 if the users worked in a multi-

language environment.

Third, you could install Boot Manager on a machine used for trade shows or presentations to allow you to demonstrate several different native platforms. (However, if you simply return to DOS on occasion, Boot Manager is not the correct solution—see the next tip.)

Enable Dual Boot so you can switch safely between DOS and OS/2.

- Make sure DOS is installed as the primary operating system on your computer's hard drive.
- Install OS/2 as desired.
- Change the CONFIG.SYS file if necessary:

SHELL=C:\COMMAND.COM /P
should be changed to
SHELL=C:\DOS\COMMAND.COM /P
(If no SHELL command is present, add it as the first line of CONFIG.SYS).
• Change the AUTOEXEC.BAT file if necessary:
SET COMSPEC=C:\COMMAND.COM
should be changed to
SET COMSPEC=C:\DOS\COMMAND.COM

You can now change the default operating system by entering at a command prompt **BOOT /DOS** to quit OS/2 and start DOS, or **BOOT /OS2** to quit DOS and start OS/2. If the command does not work, the \OS2 directory may not be in your path. In this case, enter CD\OS2 and then enter the appropriate BOOT command.

Dual Boot does not simply make it

possible to open a DOS window under OS/2. Rather, it prepares the initial sector on your hard drive to boot either DOS or OS/2. Whichever operating system you switch to will come up every time you start your computer until you use the BOOT command to switch once again.

Dual boot is perfect for the DOS user who wants to upgrade to OS/2, since it allows the user to switch quickly between DOS or OS/2. ♦

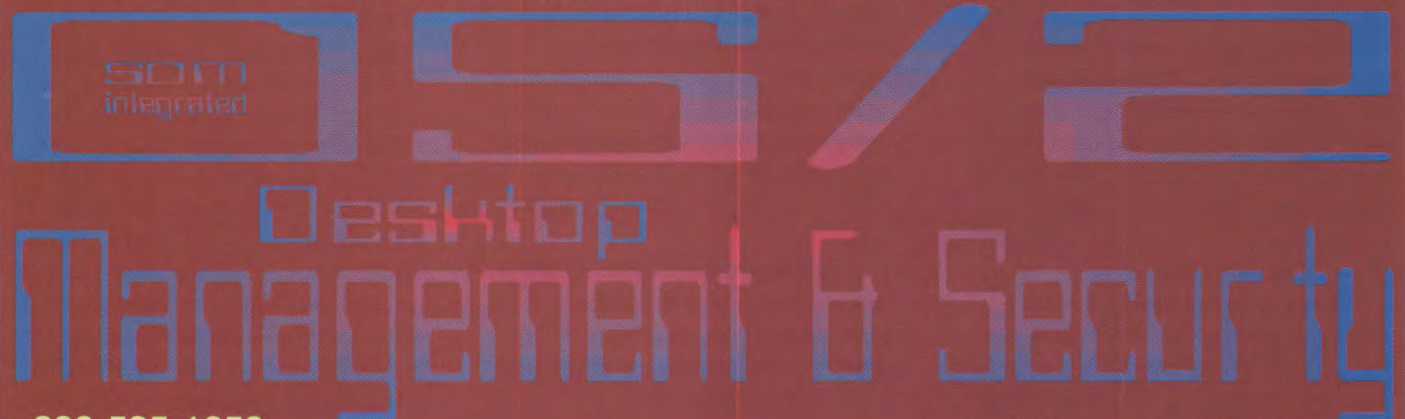
Gordon Scott works for the Software Solutions division of IBM in San Jose, California. Gordon can be reached via the Internet at gscott@stlvsm22.vnet.ibm.com.

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continued from page 9

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Via the Internet

The promise of software support

If OS/2 really is to be successful, IBM is going to have to work a lot harder at keeping the promise. Recently, I encountered three instances of OS/2 not supporting current software and, although I have been a staunch supporter, I am beginning to lose faith. Here-with, the failures and IBM's answers:

1. Faxworks/DOS—buy the OS/2 version.
2. Faxworks for Windows—buy the OS/2 version (painful, since my modem came with the above and I can't use them).

3. PC-Xaware Remote—the vendor will have to write an OS/2-specific version (too bad, I really wanted to run X-Windows in a remote-dialed session to my Unix system).

IBM needs to build stronger relations with more vendors, including those in the "under megabuck" range. It's not just the workhorse applications like word processing that drive purchases, it's the utilities and other usability programs that make life easier and productive for corporate America.

I recently delved deeper into the non-IBM world and I've discovered the secret of the rising popularity of Unix and C: If you give it away, including free access to the source code, students will take it, learn to love it, and when they grow up, will require their companies to use it. Talk about a super sales force!

Dennis J. Foreman

Via the Internet

A second honeymoon

Thank you for your timely June issue

[Special Report, Building Your Own]. I've been using OS/2 2.1 since its release. Recently, I transformed my homemade 386sx-40 mHz into a 486DX2-66 mHz VLB, with 16mb RAM. I was using my existing multi I/O controller and having one hell of a time with IRQ conflicts! Your special report on PC upgrading taught me a tremendous amount. One immediate benefit from my newly-acquired understanding was that I ordered a VLB I/O board, and it's like a second honeymoon!

Gene Lyons

Via the Internet

Message to James

Message to James P. Hanrahan regarding his comments on WordPerfect for OS/2 [Input, May]: Check out DeScribe for OS/2. It blows the doors off every other word processor out there.

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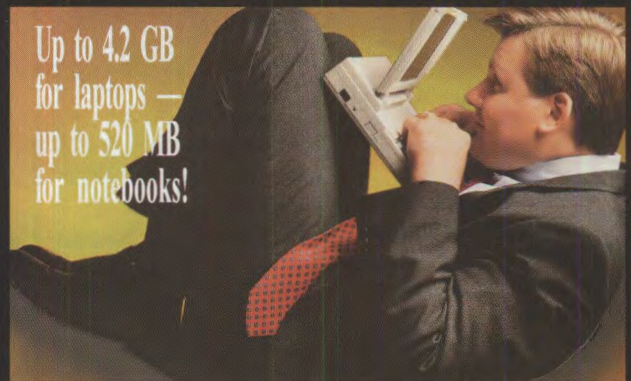
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Application Development Using OS/2 REXX

by Anthony S. Rudd, John Wiley & Sons, Inc., 416 pages, \$39.95

REVIEWED BY ALAN JAY WEINER

It's hard not to smile when the preface to a book named *Application Development Using OS/2 REXX* begins, "The title of this book *Mastering OS/2 REXX: The Practical Usage of OS/2 REXX*..."—it doesn't even know its own title! I suspect the title was changed at the last minute; *Mastering OS/2 REXX* is another title by the same publisher (Rick Cook reviewed it in the June 1994 issue).

As it turns out, neither title accurately reflects the book's contents. Rather than being a treatise on developing applications, *Application Development Using OS/2 REXX* is a rather dry introduction to REXX, followed by a technical reference to REXX instructions and functions.

As a neophyte REXX user, I looked forward to better understanding the language. Instead, I found myself being lulled to sleep. Teaching a computer language may not be the most stimulating reading, but Rudd has excised any possible excitement from this book. Frankly, it's very dull reading. He shows REXX programming one stop at a time, with each instruction tediously covered in detail. One instruction. In detail. Then another. In detail. And on and on.

To be fair, Rudd provides complete information about each instruction, and gives simple examples. It's just a boring way to learn a new language. It's also not a book for inexperienced programmers, since programming terms are frequently used without explanation.

Application Development Using OS/2 REXX reads like a textbook—I kept expecting an instructor to review what I'd just read, with a quiz on Friday. As a textbook, it could be useful; REXX instructions are covered completely, and an instructor would hopefully liven things up a bit.

After covering the REXX instructions, Rudd moves on into the myriad of functions available to REXX users. Here the detail, while still dull reading, is far more useful as a reference. The func-

tions are categorized somewhat arbitrarily into built-in functions and various extensions. Rudd provides brief summaries prior to the detailed descriptions, and then describes the syntax of each function and gives several short examples of usage.

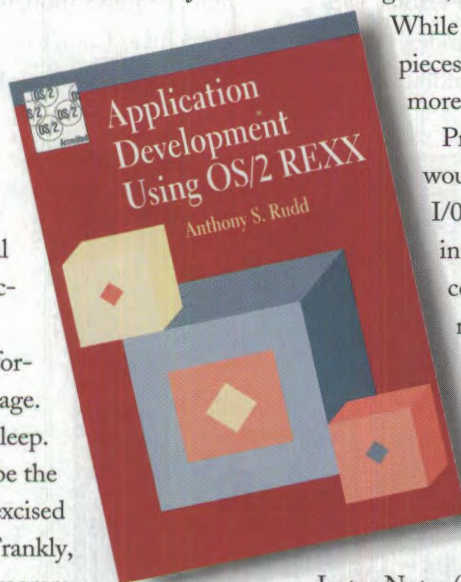
Unfortunately, there are few examples of complete REXX programs, and several of the examples aren't explained well. While you'll likely incorporate some of the example pieces into your own REXX programs, I'd like to see far more sample program.

Providing programs that actually do useful things would show how to use REXX in a real situation. File I/O could be shown by programs that count the words in a file, or search the disk for a file. A CD player could use the Media Control Interface to play music. In keeping with the title, perhaps a phone book application could be built, using DB2/2 and dialing the telephone via an interface to Communications Manager/2.

REXX's popularity is increasing. It's showing up in many applications as a scripting language—there is even an add-on package for Lotus Notes (Notrix from Percussion Software). It is a powerful language; its use as a common macro language will permit increased interaction between different software packages. Since it's been provided on all OS/2 systems since OS/2 1.3 (prior to that it was included only on Extended Systems), you can count on its availability. Visually oriented REXX interpreters and compilers provide increased ease of use and integration into the GUI world.

Despite the textbook feel and the boring tone, *Application Development Using OS/2 REXX* can be a beneficial book. While I would like more real-world examples of REXX programs, there are code fragments showing useful techniques. As a reference instead of a learning tool, it is a useful book to own. ♦

Alan Jay Weiner is president of Technology 21, a consulting firm in Waltham, Massachusetts. He can be reached on the Internet as aweiner@bix.com.



The Hourglass of Summer

BY JERRY POURNELLE

Summer isn't a good time for columnists. There's not much news, particularly in the high tech field, and it's too hot to spend the day testing software. I figured I was stuck in the doldrums waiting for IBM to drop the other shoe. Then I was reminded of why I like OS/2.

Amidst the doldrums: IBM introduced Personal OS/2, or Warp, or Portable OS/2, at spring Comdex, where it rightly won a great deal of attention. Now hundreds of thousands of copies are out on beta test, and all the reports I get are positive. It works. I also hear rumors of OS/2 with LAN, OS/2 with all VBX problems solved, and other wonderful things to come, and I cheer.

But I don't have all that yet, so I figured I'd make some room on my OS/2 system hard disk and install some new OS/2 application software to be able to tell you about it. I can do that because I have a Maxoptic Tahiti III optical disk installed on my network, and IBM OS/2 LAN Server works quietly and invisibly: I can archive big files over to the glass disk.

One problem: My biggest file is an on-line log. I want to keep the last couple of days' worth. Alas, the OS/2 enhanced editor can't handle that big a file, and when I tried to import that 10 megabyte file so I could trim off the top nine megs, the system crashed to hardware reset. Annoying. Microsoft Word 6 running under WIN-OS/2 did the job easily, so there was no problem, but I have to remember not to try enhanced editor with big files: if it crashed with nothing else running, it will surely crash if there's something mission-critical going on in the background.

After I cleaned the PS/2 Model 77's disk, I installed Card Grabber from Pacific Crest Technologies Inc. in Newport

Beach, California (800/870-3391). This little \$349 box scans business cards and feeds the information into different fields of a database.

It works, mostly. That is, Card Grabber's OCR reads standard business cards just fine. Fancier cards take some human intervention, but even so, it's a lot faster than typing. Of course, I don't usually type the information in, meaning that months later I spend hours looking for a particular card in an enormous stack. On the other hand, even with Card Grabber it takes time to enter all the cards I collect.

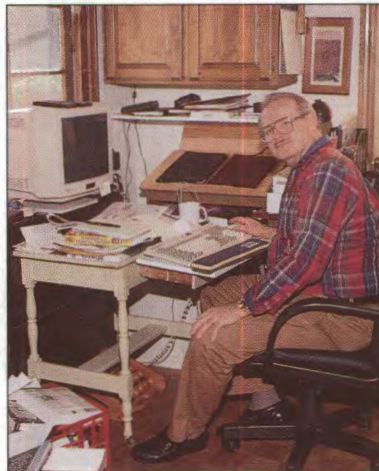
On the gripping hand, I've lately been wasting a lot of time playing Micropose's XCOM: UFO Attack, and that runs in DOS under OS/2, so maybe I can combine the jobs: feed in a card for every alien I kill. I'll have to try it.

Then last night I decided I ought to switch to OS/2 on my main system.

It happened this way. I don't do a lot of printing, but Larry Niven, Steve Barnes, and I just finished *Beowulf's Children*, a sequel to our bestseller *Legacy Of Heorot*, and I wanted to print out a copy. I started that going on a Cheetah 486/33 DX2 running Windows for Workgroups and brought my Cheetah to its knees. When Windows Print Manager has a big job to do, you're not going to do anything else. I made the mistake of trying to save a file in Word 6 while the novel was printing; six minutes later I was still watching the hourglass.

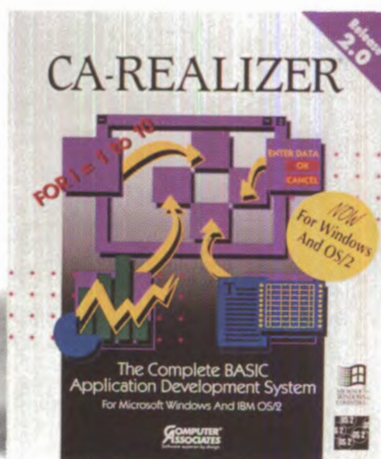
I printed the second copy using the PS/2 with OS/2.

The printing didn't go any faster, but I could still use Word 6, run Card Grabber, and kill aliens while my novel was printing. ♦



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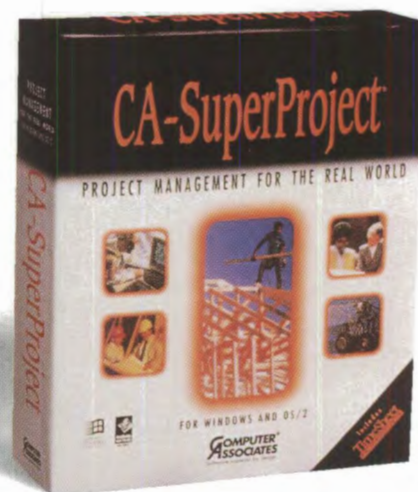
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